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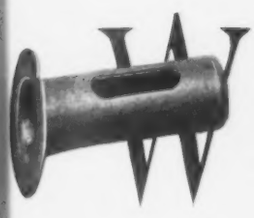
Steps in Stamping a Draw-Bolt Tube

Single Stamped Part Replaces Complicated Assembly—Cost Lowered and Design Improved—Methods of Manufacture Outlined

BY N. T. THURSTON*



WITH a view to reducing costs and improving construction the draw-bolt tube used on a widely known fireproof safe was recently re-designed, a single stamped part being devised to replace the former comparatively complicated assembly. A saving of 18 cents per piece resulted, as well as an improvement in that part of the construction of the safe.

The single stamped part is shown above, the components of the previous draw-bolt tube employed being shown in Fig. 1. The draw-bolt tube is used as a sleeve into which the bolts on the door of the safe slide, when the door is closed and the bolts thrown.

There were two principal reasons for re-designing the old draw-bolt tube. The first was the fact that the bracket, having to be fastened to the front plate of the safe, served as a ready means for conducting outside heat to which the safe might be exposed in case of fire, direct to the draw-bolts themselves, causing them to freeze fast to the sleeves. The second reason was the matter of expense. In the single stamped tube the manufacturing expense was ten cents per piece less than in the old style, and the labor expense in getting the assembly together and in place in the safe, ready to install, was eight cents less per piece. This gave a total saving of 18 cents per piece. As to weight, the old style draw-bolt tube was about six times heavier than the new stamped tube.

The old tube was constructed of two pieces of seamless steel tubing as shown in Fig. 1, the one

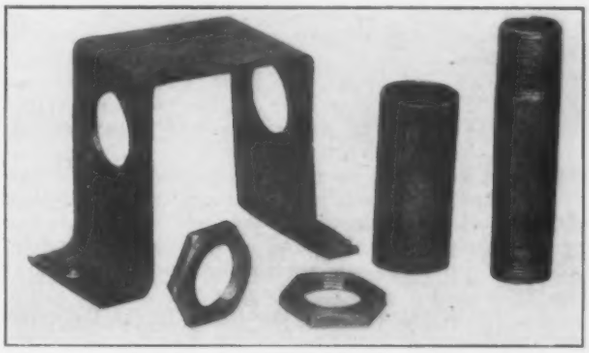


Fig. 1. Components of Draw-Bolt Tube Formerly Employed

*Acklin Stamping Co., Toledo, Ohio.

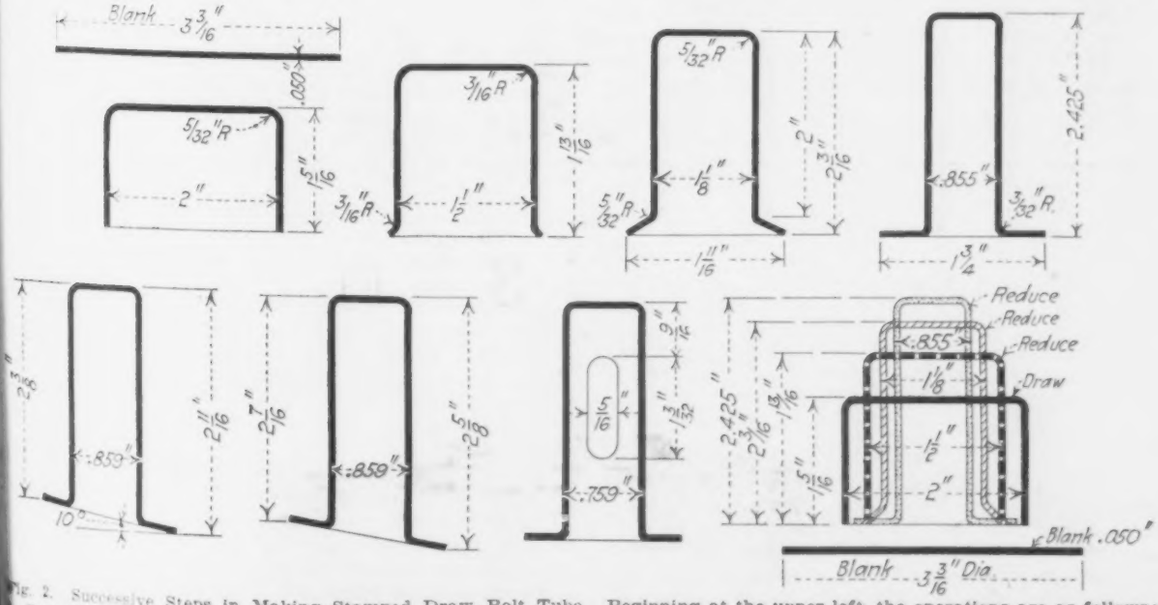


Fig. 2. Successive Steps in Making Stamped Draw Bolt Tube. Beginning at the upper left, the operations are as follows: 1, Combination; 2, 3, 4, reduce; 5, finish shape; 6, trim, and 7, slot. The layout to determine the approximate number of drawing operations is shown at the lower right

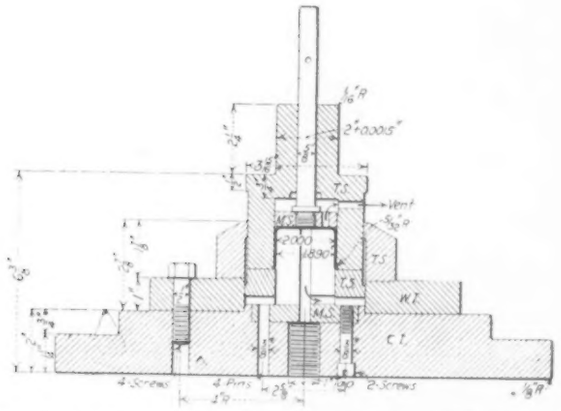


Fig. 3. Details of the Combination Die. As the punch descends the blank is cut, the punch continuing down and forming the metal around the plug

threaded on both ends and slipping inside the larger tube. Both tubes were set in position opposite the holes in the bracket and the nuts screwed up on both ends of the inner tube thus clamping the tubes to the bracket. To insure a smooth and uniform surface inside the center tube it was reamed. The assembly was then ready to be put in place on the safe and spot welded.

In manufacturing the stamped tube a good grade of drawing steel was used. This steel was furnished 3¾ in. in width and 0.050 in. in thickness and was pickled and oiled. Only two annealing operations were found necessary. The method for determining the approximate number of drawing operations necessary to bring the piece to size ready for trimming and shaping the flange at the bottom and cutting the slot in the side is shown in Fig. 2. The first operation was to cut the blank and form it around the punch to the shape shown, the blank being cut 3 3/16 in. in diameter and drawn to a length of 1 5/16 in. and to a diameter of 2 in. This work is done on the combination die shown in Fig. 3. The die is mounted on a cast-iron base and the punch turned up from a 4¼-in. bar of tool steel, the die being composed of a tool-steel cutting edge forged to a wrought-iron base with the tool-steel plug located in the center. A tool-steel draw-ring rides on the tops of four cold-rolled pins, ⅜ in. in diameter, which in turn rest on rubber buffers placed under the die.

As the punch descends the blank is cut from the strip steel, as it is fed across the die, the draw-ring holding the blank firmly against the punch which continues on down and forms the metal around the plug. On the up stroke of the ram the compressed rubbers force the draw ring to follow up the punch. At the top of the stroke the positive knock-out pin forces the cup out of the punch and it drops loose on the

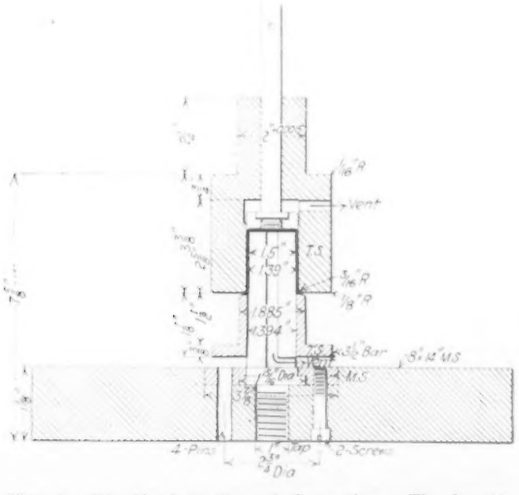


Fig. 4. Die Used in Second Operation. The length of the cup is increased ½ in. and the diameter decreased by the same amount. Before this operation the cup is annealed and washed

top of the die, to be knocked off by the operator. The vents in both the punch and the die allow the air confined on both sides of the cup to escape, preventing the stamping from buckling and tearing. A Bliss press No. 74½ was used to do this work.

To prepare it for further drawing the cup is thoroughly annealed to a cherry red, which releases all internal strains in the metal. It is previously wet in a solution of one part of muriatic acid and five parts of water, the purpose of this being to loosen the scale which invariably forms on the steel due to oxidation while red hot.

The next operation, done on a Bliss No. 84 press, increases the length of the cup ½ in., that is, from 1 5/16 in. to 1 13/16 in., the diameter being at the same time decreased ½ in., from 2 in. to 1½ in. The die for this work is shown in Fig. 4. This tool is mounted on a machine steel base 8 by 14 in. and the punch, plug, and draw-ring are of tool-steel hardened and ground. The operation of the die is similar to that of the previous one, the descending punch forcing the draw-ring down with it, thus compressing the rubbers under the die. On the up stroke of the ram the draw-ring follows the punch on its upward course and at

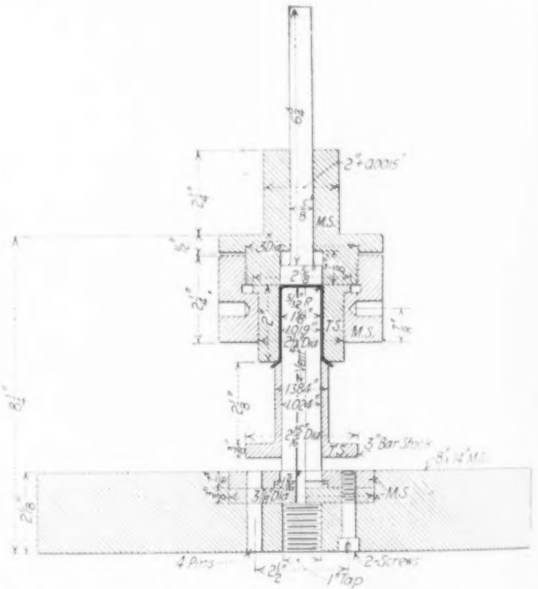


Fig. 5. The Third Operation Further Increases the Length of Cup by ⅜ In., Decreasing the Diameter Also. The die employed is shown above

the top of the stroke the knock-out pin forces the cup out of the punch. Immediately before this operation the stampings are washed in a soap and water mixture, which serves two purposes. First it removes all scale not removed by tumbling the annealed cups, and second, it serves to lubricate the cup, thus facilitating the drawing operation. The presence of scale is detrimental to the dies, causing them to wear unnecessarily. Vents are provided in the punch and plug as in the die used in the previous operation.

The third operation still further increases the length of the cup by ⅜ in., decreasing the diameter by the same amount. The die, shown in Fig. 5, is mounted on a machine steel base, and the forming parts are tool steel, hardened and ground. The construction of the punch is a little different from that usually employed. In this design tool steel is used only where needed. The machine-steel punch holder is in two parts which when screwed together hold the tool steel punch in place. The principal reason for this type of construction is that in hardening the punch it is less likely to crack than if it were fastened to the machine punch holder by means of screws, screw holes being a flagrant cause of spoiling tool steel during hardening. This work was also done on a Bliss No. 84 press, and the operation of the die the same as those described.

At this point the stamping goes through a second annealing, the process being the same as the first.

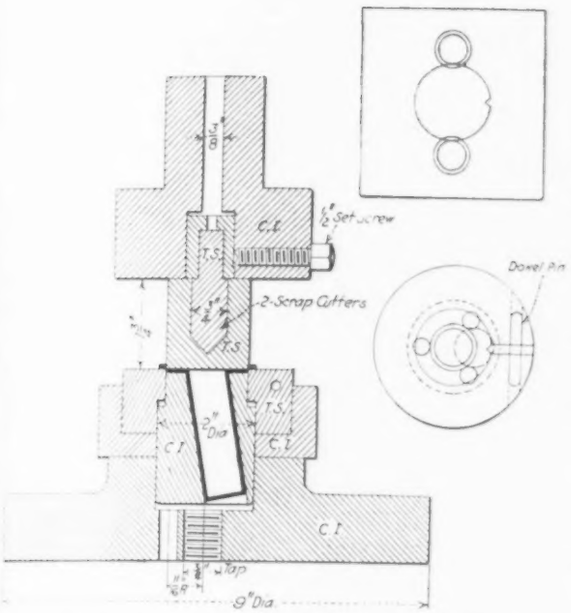


Fig. 6. Die Employed in Trimming Operation, Which Leaves the Base of the Tube with Proper Width of Flange. Plan of punch and die are shown in insert

A Bliss press No. 84 is used for this operation, which lengthens the tube ¼ in., decreasing the diameter by the same amount and forming the flange at the base perpendicular to the sides of the tube. The construction and operation of the die, is similar to the two preceding ones.

Bringing the tube to size, both as to its diameter and to the angle at the base in relation to the sides of the tube, is accomplished in the fifth operation. The die employed is mounted on a machine-steel base, the punch being constructed as previously described, in order to lessen the likelihood of its being spoiled during hardening and also to economize on the amount of tool steel used. The knock-out pin is screwed in the plug to keep it from shifting out of position.

The next step, the sixth operation, is a trimming one and leaves the base of the tube with the proper width flange. The die used is shown in Fig. 6. It is carried on a special cast-iron base, the punch being also of cast iron, into which is fitted a tool-steel cutting edge held in place by a ½ in. set screw. On the opposite sides of the cutting edge are located two tool-steel cutters, which cut through the trimmed-off scrap

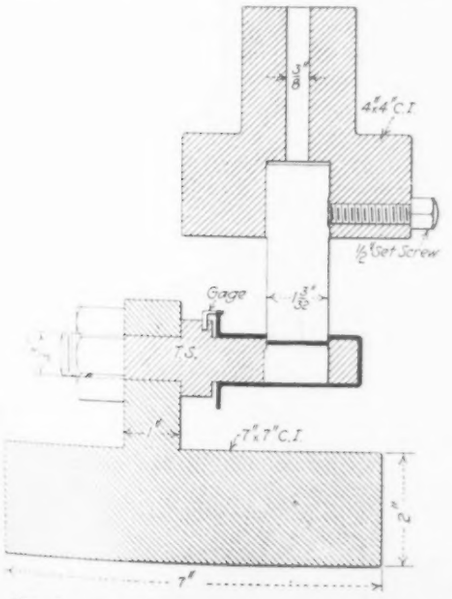


Fig. 7. The Final Operation Is Cutting the Slot in the Side of the Tube, the Die Employed Being Shown Above

rings that accumulate around the punch. The cutting edge of the die is of tool steel, held in a cast-iron matrix. This work was done in a Toledo No. 5 press. The notch in the flange is used to gage the stamping in the slotting operation which follows.

The final operation is to cut the slot in the side of the tube which is done on a Toledo No. 5 press, using the tool shown in Fig. 7, the tool being carried on a cast-iron base which holds the tool-steel plug. The punch is of tool steel and is held in the cast-iron holder by means of a ½ in. set screw. The slugs fall out as the tube is pulled off the plug, after each operation of the press. The purpose of the slot, as seen from the illustration, is to permit connecting the draw-bolt mechanism to the draw-bolt itself, which provides the means for throwing the bolts out and in the sleeves. A hole is drilled and tapped into the side of the draw-bolt, a screw run into the hole and the throw mechanism fastened to the screw. The simplicity and effectiveness of this design is apparent.

The average production of all the operations throughout a run of 100,000 finished pieces was about 5000 a ten-hour day. The dies illustrated and described were designed and operated by the Acklin Stamping Co., Toledo, Ohio.

Improvement in Unemployment

HARRISBURG, Pa., Aug. 15.—Although a number of iron and steel plants of Pennsylvania are in imminent danger of being forced to close down because of a shortage of fuel, a slight improvement in employment conditions was reported during the last half of July, according to the semi-monthly report of the Pennsylvania Department of Labor and Industry just issued.

A total of only 18,450 iron and steel workers was reported without employment on Aug. 1, as compared to 20,050 without work on July 15 and 25,500 on July 1. The decrease approximates 8 per cent.

Four of the eleven employment districts of the State reported more men without employment in the metal and steel trades than during the preceding fortnight; two, Philadelphia and Harrisburg, reported fewer men without employment; four reported no change; and the eleventh office, Reading, has just been reopened and so no report is available for the preceding period.

Unemployment conditions throughout the State as a whole, exclusive of the mine trade and the railroad shops, showed a slight improvement during the same period. The 11 offices reported approximately 92,000 without work on Aug. 1 as compared to 101,000 reported unemployed by the 10 offices on July 15. There are still large numbers of railroad shopmen and miners on strike, and the unsettled conditions in these two trades has made itself felt adversely in the iron and steel trades.

The Gartland-Haswell Foundry Co., Sidney, Ohio, although ready for operation the latter part of 1920, did not open until recently owing to the long depression. Its first heat was taken a short time ago. The plant is running about 25 per cent of its capacity of 50 molders per day on automobiles, farm implements and washing machine gray iron castings. The officers of the company are: M. F. Gartland, president; Frank X. Gartland, vice-president; John C. Haswell, treasurer; W. J. Gruss, sales-manager; M. B. McKee, secretary and manager; G. R. Wood, factory superintendent. This foundry is affiliated with 14 other gray iron and malleable castings plants in the Central West, which are controlled by the Gartland-Haswell-Rentschler foundry interests.

The British Empire Steel Corporation, Sydney, N. S., office reports that 12 steamers are engaged in the export of iron ore from Wabana, Newfoundland, to Germany, via Rotterdam. About three quarters of a million tons will have been exported before the end of the year. These shipments are being made on an order the British Empire Steel Co. received a couple of months ago for 4,000,000 tons to be exported to steel companies in Europe.

Stainless Steel at High Temperatures

Heat Treatment Which Produces the Greatest Strength for Use in Valves of Internal Combustion Engines

BY H. J. FRENCH*

STAINLESS steel, containing about 0.3 per cent carbon and 13 per cent chromium, has been successfully used at high temperatures, notably in valves in internal combustion engines. Quite probably more extended application will be made along similar lines in the future on account of its peculiar combination of desirable properties after suitable heat treatment.

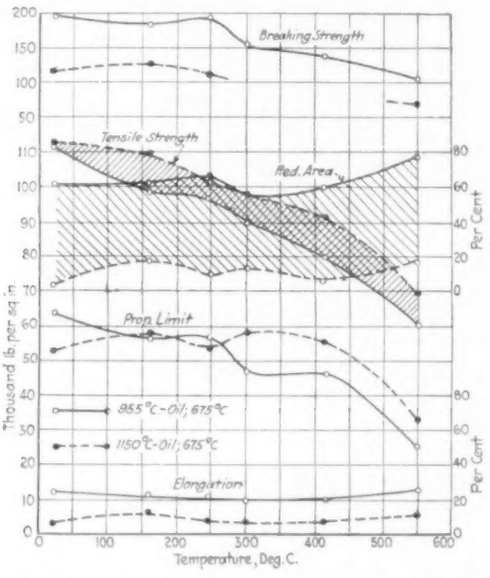


Fig. 1.—Tensile Properties at Elevated Temperatures of Stainless Steel First Oil Quenched from Either 955 or 1150 Deg. C. and Tempered at 675 Deg. C.

Composition: C., 0.31; Mn., 0.24; Si., 0.05; Cr., 12.75, and P. and S. each 0.020 per cent.

Breaking strength is taken as the load at fracture (in lb.) divided by the reduced cross section (in sq. in.).

It has already been shown that the high quenching temperature which produces maximum hardness is not that which produces the best tensile properties at ordinary temperatures, i.e., best combinations of strength and ductility.† Naturally the question arises as to which of these two hardening methods is most suitable for steel which is to be subjected to high temperature service and with this in mind two series of tensile tests were made throughout the range 20 to 550 deg. C.

The steel was first oil quenched from either 955 or 1150 deg. C. and subsequently tempered at 675 deg. C. The first of these methods of hardening produces excellent combinations of strength and ductility whether or not the steel is subsequently tempered, while maximum hardness is produced with moderately rapid cooling from the range around 1150 deg. C. A single and relatively high tempering temperature was chosen in order that

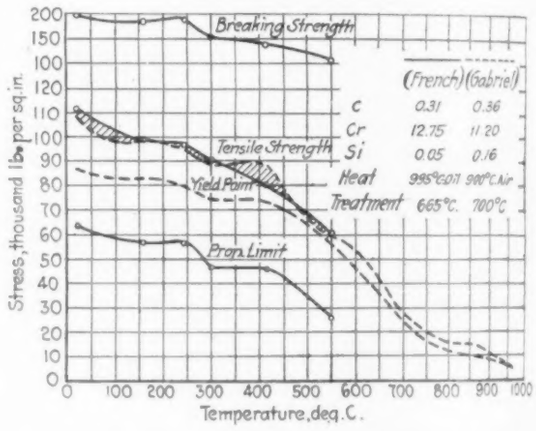


Fig. 3.—Strength and Elastic Properties of Stainless Steel at Various Temperatures as Reported by Both Gabriel and the Author. Breaking strength is taken as the load at fracture (in lb.) divided by the reduced cross section (in sq. in.)

*Physicist, Bureau of Standards, Washington. Published by permission of the bureau.

†French and Yamauchi: The Heat Treatment of a High-Chromium Steel, *Jour. S. A. E.*, VII, No. 1, p. 103 (July, 1920).

Table I—Comparison of Tensile Properties at Various Temperatures of Stainless and Carbon Steels

1	2	High Temperature Properties of Various Steels Compared to Normalized 0.32% C. Steel. (Values represent per cent increase (+) or decrease (—) from figures given in column 2)		
	Properties of Normalized Carbon Steel (0.32% C.; Air Cooled from 850° C.)	Quenched and Tempered Carbon Steel (0.33% C.; 840° C. Water; 540° C. Air)	Cold-Rolled Boiler Plate (0.25% C.; Reduced 1/8 In. from 1/2 In. Thickness)	Heat-Treated Stainless Steel (0.31% C. 12.75% Cr.; 955° C. Oil; 675° C. Air)
Tensile strength, lb. per sq. in.				
At room	74,350	+ 34	+11	+ 50
At 300° C.	83,160	+ 25	+ 4	+ 8
At 550° C.	31,880	+ 41*	+47*	+ 90
Prop. limit, lb. per sq. in.				
At room	43,400	— 5	+30	+ 46
At 300° C.	25,750	+ 61	+18	+ 83
At 550° C.	9,375	+ 28*	+92*	+175
Elongation in 2 in., per cent				
At room	35.3	— 23	—39	— 31
At 300° C.	27.5	+ 29	—23	— 28
At 550° C.	44.0	.....	.....	— 40
Reduction of area, per cent				
At room	57.4	+ 18	— 3	+ 6
At 300° C.	30.3	+114	+50	+ 83
At 550° C.	87.8	.....	.....	— 13

*Values obtained by extrapolation of curves from 470 deg. C.

the test results might be of widest interest as tempering below operating temperatures (which may be high) would of course result in quick softening of the metal when first placed in service.

It is at once evident from Fig. 1 that the higher quenching temperature (1150 deg. C.) produces metal generally about 10,000 lb. per sq. in. stronger at high temperatures than that similarly quenched from 955 deg. C. However, this small increase is obtained at the expense of a very large proportion of the ductility. Elongation has decreased about half and reduction of area has dropped from values between 60 and 80 per cent to less than 20 per cent throughout the entire range considered.

An even more striking illustration of the deleterious effects of the high temperature quench is shown in examination of fractures, two series of which are reproduced in Fig. 2. Coarsely crystalline breaks are obtained with little or no elongation such as is observed in the series first quenched from 955 deg. C. The latter likewise show much finer structures.

Unlike carbon steels which are strongest and at the same time most brittle around "blue-heat" (300 deg. C.) the strength of stainless steel decreases steadily with rise in temperature. Confirmation of this can readily be obtained from the work of other investigators as shown in Fig. 3. However, comparison with the properties of carbon steels in normalized, cold rolled and quenched and tempered conditions (Table I) shows some decided advantages for stainless steel.

It has very much higher strength and limit of proportionality in the range about 550 deg. C. where most carbon and structural alloy steels show a decided "weakening"; at the same time it retains good ductility. However, its advantages at lower temperatures, between 20 and 300 deg. C., over quenched and tempered carbon steel of similar carbon content are not so marked.

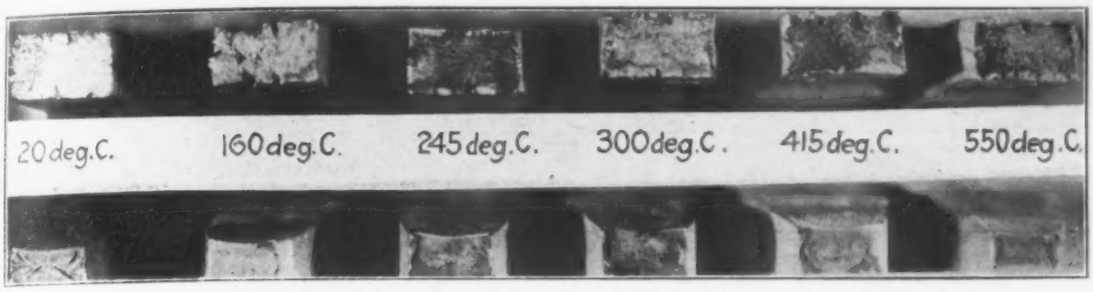


Fig. 2.—Fractures of Stainless Steel Broken in Tension at Various Temperatures
Top row: Oil quenched from 1150 deg. C. and tempered at 675 deg. C.
Bottom row: Oil quenched from 955 deg. C. and tempered at 675 deg. C.
Each pair of samples broken at temperatures indicated.

Proposed Duties on Manganese and Tungsten

WASHINGTON, Aug. 15.—Declaring that the United States Senate in its tariff making has adopted one system for one commodity and another system for another commodity, Senator Pomerene of Ohio in the Senate last week called attention to the proposed duties on manganese and tungsten.

The discussion was on the subject of potash, which Senator Pomerene declared should come in free for the agricultural interests in the country, stating that it has not been demonstrated that sufficient quantities of potash are produced in this country to make it commercially profitable. "The same situation," he said, "exists as to ferromanganese, tungsten and other alloy metals. I think it was perfectly clear from the debates on the floor of the Senate that such manganese and tungsten as we had, as well as other alloy ores, are low grade ores. There is a very great deal of uncertainty as to whether they can ever be produced from our deposits in commercially profitable quantities. The question that occurred to me is this:

"Why do you adopt the policy of a tariff to encourage the production of manganese and tungsten, and then, when it comes to potash, discard the protective theory entirely and adopt the bounty system of encouraging production? If the one scheme is advisable as to the ores that are used for alloys, why not in the other; or, if the bounty system is advisable when it comes to potash, why not as to the other?"

Senator McCumber answered that the proposed duty on potash is for the protection of the American industry. Senator Pomerene said further:

"It was conceded here in the course of the argument, I think, that the duty on the alloys would add $10,000,000 per year to the cost of steel to the consumers. I think those figures were generally admitted. I do not think it has been demonstrated that you have deposits in this country from which manganese or tungsten can be produced in commercially profitable quantities. Of course, I have no personal knowledge on this subject, and I am dependent on what the steel people say with regard to it. They are convinced that such deposits do not exist, or, at least, that they have not been discovered in such quantities as will justify an attempt to produce them in this country."

General Refractories Co. Absorbs Three Other Companies

Announcement has been made of the absorption by the General Refractories Co. of the Pennsylvania Fire Brick Co. with works at Beech Creek, Pa., the Hays Run Fire Brick Co., Orviston, Pa., and the Standard Refractories Co., Claysburg, Pa. These acquisitions will give the General Refractories Co. a daily capacity of approximately 900,000 refractory brick, making it the second largest producer in the country. Coincident with this development, the company has surrendered its West Virginia charter and has been incorporated under the laws of Pennsylvania. The West Virginia company was capitalized at $5,000,000 (50,000 shares of $100 par) of which $500,000 was held in the treasury for the absorption of its foreign subsidiary, the General Magnesite Co., Czecho-Slovakia. The Pennsylvania company has a capital of 180,000 shares of no par value and has issued $4,000,000 6 per cent bonds, to provide funds for refunding of current obligations, to furnish working capital and for the payment of the companies just taken over.

Fire hazards connected with industrial operations and how to eliminate and control fire dangers will be shown at a fire prevention exposition to be held Oct. 2 to 7, at the Twenty-second Regiment Armory, New York. It is proposed to show the latest developments in fire-safe construction and also to demonstrate the proper appliances to be used in fighting and preventing fire. A. E. MacKinnon, 405 Lexington Avenue, New York, is chairman of the exposition committee.

TESTS WITH SPECIAL STEELS

German Results on Various Chrome-Nickel Steels at High Temperatures

A LONG paper by Prof. H. Edert, giving the detailed results of experiments carried out at increasing temperatures on five alloy steels, appears in the issue of *Stahl und Eisen*, June 22. The steels were in the shape of 25 mm. rounds (0.984 in.) furnished by the Friedrich Krupp Co., Essen, and were tested in heat-treated condition as supplied by the works. The composition of the steels is shown in the table.

Table of Composition of the Special Steels Used

No.	Carbon, Per Cent	Manganese, Per Cent	Phosphorus, Per Cent	Sulphur, Per Cent	Silicon, Per Cent	Copper, Per Cent	Nickel, Per Cent	Chromium, Per Cent	Vanadium, Per Cent
1	0.31	0.22	0.010	0.025	0.27	0.06	1.90	1.53	...
2	0.21	0.28	0.018	0.050	0.21	0.06	4.03	1.69	...
3	0.37	0.20	0.006	0.046	0.28	0.03	0.03	2.38	0.58
4	0.12	0.49	0.006	0.048	0.36	0.05	1.49	15.8	...
5	0.28	0.48	0.008	0.048	0.09	0.08	5.76	20.6	...

The first three steels had been quenched in oil and drawn, the fourth quenched at 900 deg. in oil and drawn at 650 deg. C. in oil and the fifth quenched at 1200 deg. in oil. Tensile tests were carried out at ordinary temperature, and at 200, 300, 500, 600 and 700 deg. and in some cases at 800 deg C. Brinell hardness tests at 20, 100 and 300 deg. C. Also shock tests and bending tests were made. Details of the methods of heating the samples and carrying out the tests are given in the original paper, and the results are shown in a very interesting series of diagrams.

The low percentage chrome-nickel steels, Nos. 1 and 2, were found to be easy to work. They have a fine structure and take a good polish, and are suitable as construction materials for parts of machinery with exacting requirements where the least possible weight is required. They show great resistance against alternating stresses and shocks and also against separate heavy blows. It is recommended that in such cases the special parts be properly designed and large fillets be provided as the cross section changes. The steels can be used for temperatures up to 500 deg. C.

The chrome-vanadium steel, No. 3, is more difficult to machine than those mentioned above, but still can be worked fairly well. It has a remarkably fine structure, very suitable for wearing surfaces, and is suitable as construction material for parts with difficult requirements, because of its resistance to alternating stresses and shocks. It can be used up to 500 deg. C., but great care must be used if these temperatures rise to 600 deg. C. because the special properties given by heat treatment are lost.

The high percentage chrome-nickel steel, No. 4, is noticeable because of its great resistance to oxidation and chemical action. The test pieces carried to 700 deg. C. showed no coating of oxide. The steel can be machined with care. In regard to its hardness and other special properties, it is very similar to the low percentage chrome-nickel steels. It can, therefore, be used as construction material where the requirements are for tenacity and toughness and a considerable amount of resistance to chemical action. The temperature limit is about 600 deg. C.

The high percentage chrome-nickel steel, No. 5, has a fine nickel like color and like the other steels takes a good polish, and notwithstanding its comparatively low Brinell hardness shows considerable resistance to abrasive wear. It can be machined but with more difficulty than steels Nos. 1 to 4. It is necessary to increase the speed of turning or sawing or else to use harder tools. This steel is very susceptible to changes of shape, because of its plasticity. At a clear red heat it can be forged something like tool steel and in the cold condition is comparatively easily shaped by drawing, pressing or stamping.

The most important property of this high chrome-nickel steel is its remarkable resistance to chemical action; for instance, a polished section etched in nitric acid solution in alcohol for 5 hr. was not sufficiently attacked to show the microstructure. Hydrochloric acid (1 per cent) in alcohol was necessary for 1 to 2 hr. This steel withstands high temperatures better than the other steels and annealing for 8 hr. at 100 deg. C. shows very little surface attack. Polished sections and other test pieces can be left without care in the laboratory for a year without being attacked. It can be used for parts of machinery, if consideration is given to the low elastic limit and the parts made correspondingly larger. It is suitable for places where resistance to rust, ability to take a high polish, resistance to sea water or other corrosive agents, or to high temperatures are required. It cannot be magnetized, is plastic and shows very great resistance to the formation of cracks.

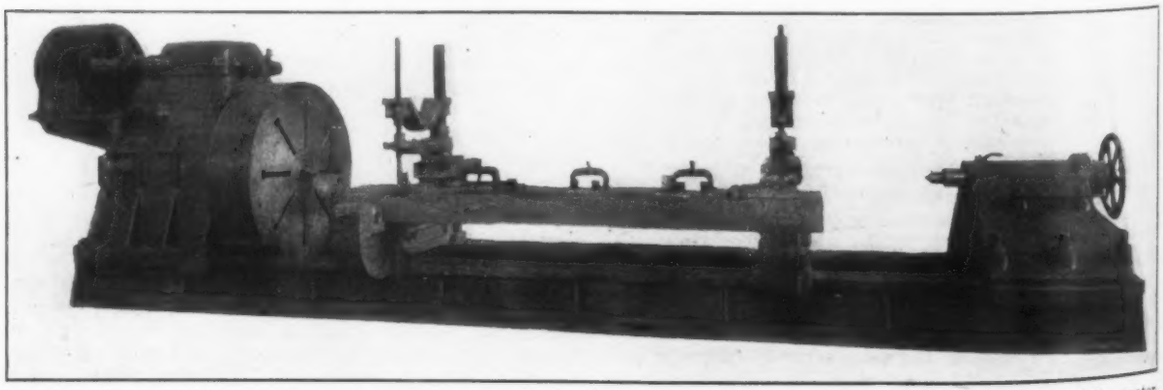
G. B. W.

Large Lathe for Chilled Rolls

A large roll lathe built recently by the Reading Iron Co., Scott Foundry dept., Reading, Pa., is shown in the accompanying illustration. It has a capacity for turning a chilled roll 42 in. in diameter by 120 in. length of body. It is driven by a 20 hp. variable-speed motor, the speeds of which range from 400 to 1600 r.p.m.

The main spindle bearing is 7¾ in. in diameter and all gears are machine cut. The face plate speed is four-tenths of a revolution to one and six-tenths revolutions per minute. Bearings are liberally proportioned and the entire construction embodies the strength needed for the heavy service for which the machine was designed. The total weight of the lathe shown is 35,000 lb.

Enough recoverable bituminous coal to meet the demands of the next 290 years, at present rate of consumption, lies in the Pennsylvania fields, according to a report of the State Bureau of Topographic and Geological Survey. The figure is given as 43,830,860,000 net tons, after deducting from the total known capacity of the fields the unrecoverable coal and waste. The amount already mined is put at 5,519,775,000 tons.



Lathe for Turning Chilled Rolls. The capacity is for rolls 42 in. in diameter by 120 in. length of body. A 20-hp. motor is used

METAL SCHEDULE

Little Change Probable in Final Consideration of the Tariff Bill

WASHINGTON, Aug. 15.—The metal schedule of the tariff bill probably will be changed little, if any, from its present form, when the measure is voted on by the Senate Saturday of the present week. Beginning this afternoon, the Senate started to vote without further debate on all committee amendments not disposed of, and at not later than 10 p.m. Thursday it will vote without further debate on all pending individual amendments. When the bill is brought to a final vote in the Senate on Saturday, in accordance with a unanimous consent agreement, it will have been before that body exactly four months. Discussion of the metal schedule occupied about six weeks of this time. It has been changed considerably, particularly with regard to certain raw products and the ferroalloy section, by the Senate as a whole, when compared with the form in which it was reported by the Committee on Finance. The most important changes have related to the transfer of manganese ore from the free to the dutiable list and sharp increases in the duties on ferromanganese, magnesite, and a small increase in the duty on fluorspar. The metal schedule as a whole now does not differ much from the schedule as it passed the House. Because of this, it is not likely that there will be much difference of opinion between House and Senate conferees on the metal schedule itself when it is sent to conference.

Work of the Conferees

The conference is to follow after the bill is sent back to the House, where the original measure was passed more than one year ago. It is the hope of Chairman McCumber of the Senate Finance Committee to have the conferees begin their work early next week. Senator McCumber has said that every effort will be made to have the measure reported out of conference within a few weeks and to have it enacted into law before the fall election campaign begins. In the event, however, that the measure is held up in conference, until a short time before election, the Republicans may prevent its passage at the present session, because of the fear of political reaction, should the measure not be given a chance to operate and to be understood before the political campaign is ended. Republicans deny emphatically that they intend otherwise to hold the measure in conference until after election.

The greatest point of contention in conference will be whether the House American valuation plan is to be discarded for the Senate plan, which provides for foreign valuation, subject to the provisions of the so-called flexible tariff amendment, which was adopted last Friday. This form of tariff is new in the annals of American tariff legislation. The question of constitutionality was raised by a number of Senators who were opposed to the plan because of what they declared is the danger of transferring the taxing power from the legislative branch to the chief executive.

Proposed Flexible Tariff

Briefly, the Senate granted authority to the President to increase or decrease the rates in the pending tariff bill until July 1, 1924. The original proposals for the establishment of a flexible tariff were considerably modified. The much mooted question of American valuation was disposed of easily in that now it will apply only to dyestuffs and coal-tar chemicals. Under the amendment adopted by the Senate, the United States Tariff Commission, in addition to the duties now imposed upon it by law, is directed to—

(1) Ascertain conversion costs and costs of production in the principal growing, producing, or manufacturing centers of the United States of articles of the United States, whenever in the opinion of the commission it is practicable; (2) ascertain conversion costs and costs of production in the principal growing, producing, or manufacturing centers of foreign countries of articles imported into the United States, whenever in the opinion of the commission such conversion costs or costs of production are necessary for comparison with conversion costs or costs of production in the United States and can be reasonably ascertained; (3) select and describe articles which are representative of the classes or kinds of articles imported into the United States and which are similar to or comparable with articles of the United States; select and describe articles of the United States similar to or comparable with such imported articles; and obtain and file samples of articles so selected, whenever the commission deems it advisable; (4) ascertain import costs of such representative articles so selected; (5) ascertain the grower's, producer's, or manufacturer's selling price in the principal growing, producing, or manufacturing centers of the United States of the articles of the United States so selected; and (6) ascertain all other facts which will show the difference in or which affect competition between articles of the United States and imported articles in the principal markets of the United States.

The import cost is defined as "the price at which the article is freely offered for sale in the ordinary course of trade in the usual wholesale quantities for exportation to the United States, plus, when not included in such price, all necessary expenses, exclusive of customs duties, of bringing such imported articles to the United States."

Penalizing Discrimination

The provision for penalizing discriminations against American trade is worthy of consideration and has been supported by iron and steel makers. The amendment provides that if a foreign country does not afford American commerce that equality of treatment which it is the American policy to grant, the President has the power to take more drastic measures and, if necessary, apply an embargo. It is necessary, however, for the President to find after investigation, that there is a discrimination. The additional duties are limited to the extent of the discrimination, but if the discrimination is maintained and continued, the importation of the merchandise may be prohibited entirely.

Considerable interest is being manifested in the appointment of the Senate conferees. While according to precedent the three ranking Republicans and the two ranking Democrats on the Finance Committee would be named, it seems likely that this custom will not be followed in the present instance. This is due to the fact that Senator La Follette of Wisconsin, a strong opponent of the tariff bill, is the third ranking Republican, and it is doubted that he will be appointed. In the event that he is not, it has been indicated that Senator Dillingham of Vermont will be named in the place of Senator La Follette.

Reductions in Pig Iron Rates from the South

WASHINGTON, Aug. 15.—Reductions in rates on pig iron from the Birmingham, Ala., district to Ohio and Mississippi river crossings are proposed in Speiden's tariff supplement filed with the Interstate Commerce Commission, to become effective Sept. 1. Carriers north of the Ohio river have not joined in any of the reductions, so that joint rates are not to be reduced and consequently the decreases in rates to consuming points north of the river arising from combinations will be due to the action of the Southern carriers only. The reductions to be made are proposed in addition to those that became effective July 1, when the general 10 per cent decrease went into operation. It had been previously intended by Southern carriers to effect joint rates with Northern lines, so as to make them applicable to consuming points north of Ohio river, such as Chicago.

The proposed reduced rates in gross tons are $3.53 to Cincinnati, Cairo, Ill., New Albany and Evansville, Ind.; $3.24 to Louisville and $4.24 to St. Louis. Previous to July 1, the rate now proposed to be $3.53 was $4.50. At present this rate is $4.05. The rate to Louisville was reduced from $4.13 to $3.71 and the rate to St. Louis was reduced from $5.74 to $5.16 when the 10 per cent cut went into effect. The through rate from Birmingham to Chicago was brought down from $6.67 to $6.01 at that time.

The Chase Metal Works, Waterbury, Conn., has added to its fleet of tractors four new towmotors, the product of the Towmotor Co., Cleveland.

Electric Motor Drive in Steel Industry

Mill Requirements for Adjustable Speed—Considerations of the Flow of Metal Under Rolling Pressure and Its Effect on Power Demands

BY GORDON FOX*

(*Concluded from page* 341, *Aug.* 10)

HAVING reviewed briefly the more general mill types, we may now consider the characteristics of the motors suited to their drive.

Mills revolving in one direction only may require either a constant speed or an adjustable speed. Continuous blooming and billet mills, sheet mills, three-high plate mills, rail, structural and merchant mills, are among

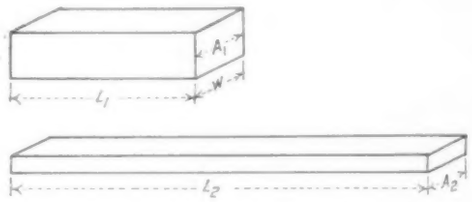


Fig. 7. Displacement Diagram for Rolling, in Which A_1 Is the Original Area, A_2 the Final Area, W the Width, L_1 the Original Length and L_2 the Final Length. The elongation E is $\frac{L_2}{L_1}$, while the draft is $\frac{A_1 - A_2}{W}$ and the volume displaced, $L_1(A_1 - A_2)$

those frequently equipped with constant speed drives. Some of the newer mills are arranged for adjustable speed where the older mills managed with single speeds. Most constant speed mills are provided with wound rotor induction motors, both because of the suitability of this type and also because alternating current power is more readily available. Flywheels are used with many of these drives. The synchronous motor offers possibilities for application on some continuous mills which run at constant speed and fairly steady load, and which cannot well utilize flywheels. But it has insufficient starting torque where it is desired to reverse or back out a cobble. It can, however, develop sufficient torque to start against mill friction and inertia, and offers some advantage as to efficiency and power factor. Dynamic braking can be employed for a quick stop, if desired.

There are many reasons for the requirement of adjustable speed for some mills. Among these are the following:

Lighter materials may usually be handled and rolled at higher speeds without straining the mill or overloading the motor. It is usually desirable to roll the lighter sections as fast as possible, not only for production, but also to prevent excessive cooling.

The skill of workmen in handling the piece between passes may limit the mill speed. As this condition is subject to change and improvement, it is desirable to be able to adjust accordingly.

Some speed adjustment may be desirable to make up for variations in roll diameters. These diameters may vary as much as 20 per cent from original to final size.

It may sometimes be desired to roll some unusually heavy orders at low speeds to minimize the strain on the mill or to limit the power peaks, particularly with purchased power.

Some qualities of steel may dictate the use of lower speeds and lower temperature of rolling.

It may be of advantage to adjust the speed of rolling to obtain a constant finishing temperature, to maintain accurate gage and section.

It may be desired to adapt the mill speed according to the heating of the furnace, or the rate of shearing.

In a roughing mill slower speeds are desirable where heavier drafts are to be taken, as the metal then enters the rolls better.

Adjustable speed is of particular advantage at the finishing rolls—commonly a limiting factor of production. If adjustable speed is not provided, the speed for all products must be that suited for the slowest.

Where two or more stands or mills are in tandem, it will usually be necessary to adjust the speed of one to suit the others. This refers especially to the roughing and finishing groups of continuous or combination mills, where the metal is in several stands simultaneously. In mills of this general type it is also of advantage to be able to vary the relative speed of roughing and finishing rolls, according to the total

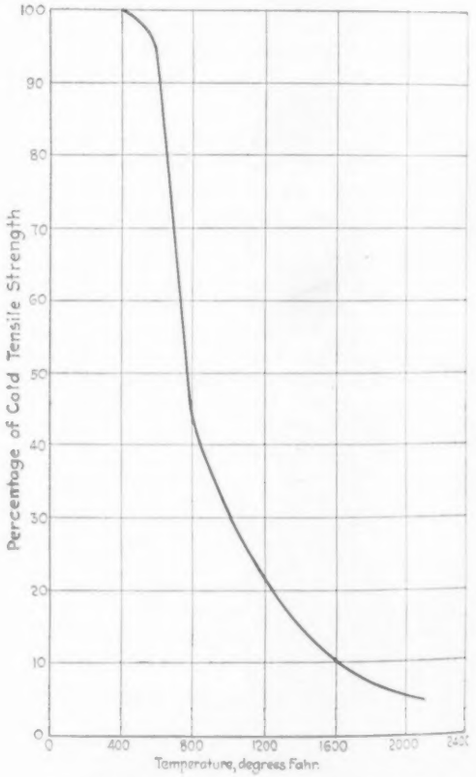


Fig. 8. Curve Showing the Variation in Tensile Strength of Steel at Different Temperatures, in Percentage of Its Cold Tensile Strength

elongation, and to apportion the reduction between the mills as desired.

An adjustable speed drive is used at the structural mill of the Inland Steel Co. at Indiana Harbor, Ind., to enable the piece to be entered at low speed and to enable the speed in the pass to be adapted to the length and section of the piece. A low entry speed is of particular benefit in rolling some structural shapes involving deep flanges.

[Here follow considerations of types of motors suited electrically to the several requirements outlined above.—EDITOR.]

*Electrical engineer Freyn, Brassert & Co., Chicago. The paper, which was read before the Western Society of Engineers, won the Robert W. Hunt prize for the best discussion of some phase of the steel industry.

When the type of mill and drive are determined, the question of motor size demands consideration. Steel mill practices are largely empirical, being based on precedent and experience. However, as mills differ, it is desirable to have some measure by which data on known conditions may be extended in its application.

Little is known as to the flow of metal in the rolling process and no precise formula for power consumption can be derived. The governing factors are understood, however, and empirical methods have been developed for their application.

The load demand of a mill is composed of three components. The friction load is considered as the demand

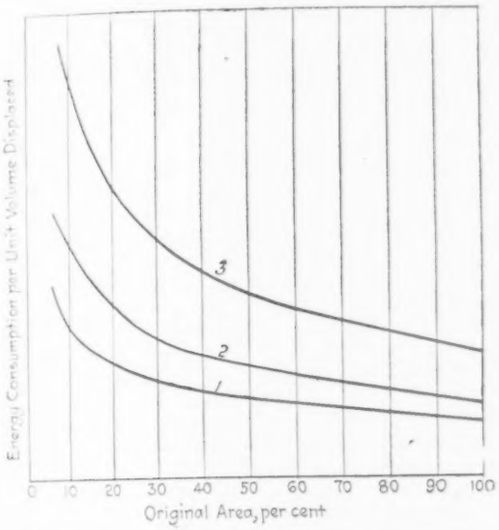


Fig. 9. Curves of Specific Power Consumption (Values of the Ordinates Were Withheld at the Source) in Which 1 Represents a Reversing Blooming Mill, 2 a Lauth Plate Mill Rolling Reheated Slabs and 3 a Billet Mill Rolling Reheated Blooms and Consisting of a Continuous Roughing Mill and a Belgian Finishing Mill

when the mill is running empty. This demand is in the nature of a constant torque with power in proportion to speed. The value of the friction load may be determined by test or approximated by comparison with similar mills. Reversing mills involve an element of inertia load due to the imparting and absorbing of the kinetic energy in accelerating and reversing the mill. This load may be calculated from weights and radii of gyration of rotating members based on a selected rate of acceleration. Flywheel effect is also an inertia load which relieves the motor as the speed drops and which adds to the motor load during acceleration periods.

The load demand incident to rolling is taken as including not only the power required for displacement of metal, but also the friction of the metal with the rolls and collars and the increased friction at the roll necks, spindles and pinions. It is evident that so inclusive a factor is not susceptible to theoretical calculation.

In rolling blooms, billets, slabs, flats, plates, strip and similar shapes, the metal is displaced almost entirely in the direction of rolling. It has been found that the power required to roll these shapes is consistent, provided similar rolling conditions maintain. In rolling special shapes in closed passes such items as side displacement, indirect pressure, collar friction and end thrust complicate the problem to such an extent that no formulæ are applicable and determinations of power must be based on precedent.

Both the volume of metal displaced and the elongation are used as the bases of formulæ for power determinations for simple rolling. It has been found empirically that the power consumed is proportional to the volume of metal displaced. Referring to Fig 7, *HP sec.* is proportionate to $L.\ (A_1\text{-}A_2)$. It has also been found that the power demand is closely proportional to the logarithm of the elongation. (*HP* is proportionate to log *E*.)

The volume displaced and the elongation in a given pass both depend upon the draft. This may be dictated by the number of passes available and the reduction desired. It is limited by the strength of the mill and by the allowable peak demand on the motor or on the power system. The possible draft is limited by the ability of the rolls to "bite." The larger the rolls the greater the draft that may be taken without exceeding the limiting angle of rolling, which corresponds to an arc of about 30 deg. on the roll periphery. The draft seldom exceeds 30 per cent, and is more commonly 15 to 20 per cent.

Some steels develop rough edges if heavy drafts are taken. The draft is often varied as rolling progresses. In rolling plate, for instance, the heavier drafts are taken on the first passes while the piece is hottest. The spring of the rolls then causes the piece to be thicker in the center. To eliminate this, the draft in the later passes must be conservative.

It is probable that, with relatively heavy drafts, the power consumption is increased by the fact that the average distance of displacement of the metal must be greater.

There are several factors which modify the power required per unit of volume displaced or per unit of elongation. Foremost among these is temperature. The power required is closely proportionate to the tensile strength of the metal. Fig. 8 shows how the tensile strength of steel varies with temperature. The usual rolling range is from 1800 to 2300 deg. Fahr. Cold rolling requires about twenty times the power of hot rolling, per unit of displacement. It is evident that the specific power consumption in the later passes may be relatively high. From the power viewpoint it is obviously desirable to roll at temperatures as high as possible.

From the viewpoint of quality of steel it is necessary to avoid too high an initial temperature; moreover, finishing at lower temperatures may give added strength. For instance, a thin plate rolled from a given slab will have greater unit tensile strength than a thick plate from the same slab, due to greater density and finer grain incident to the additional rolling and lower finishing temperature. A lower finishing temperature may also be of assistance in finishing to gage.

The quality of steel may influence its rolling power. The composition of steel does not greatly affect its strength at rolling temperatures, but high carbon and alloy steels should not be heated above 2000 deg. Fahr., for fear of burning and oxidation of alloys. They are therefore commonly rolled at lower temperatures, and thus require more power per unit displacement. The composition of the steel affects the action of the steel in rolling, rather more than the power requirement.

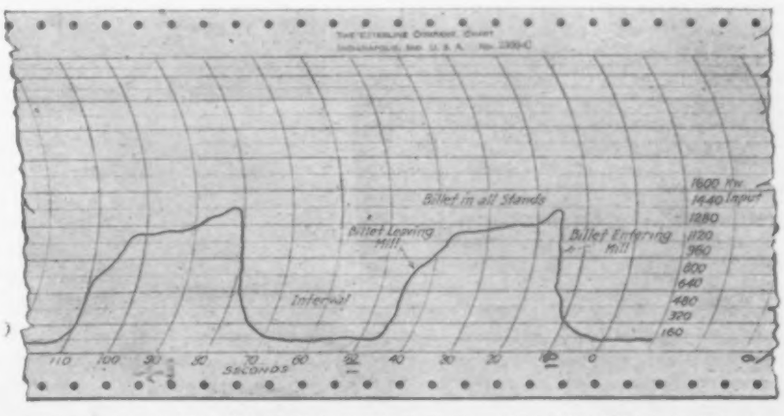


Fig. 10. Load Chart from the Continuous Roughing Mill Shown in Fig. 2 (Page 339, Aug. 10) Rolling 7¾ x 2-In. Blooms into 7¾ x 0.315-In. Skelp

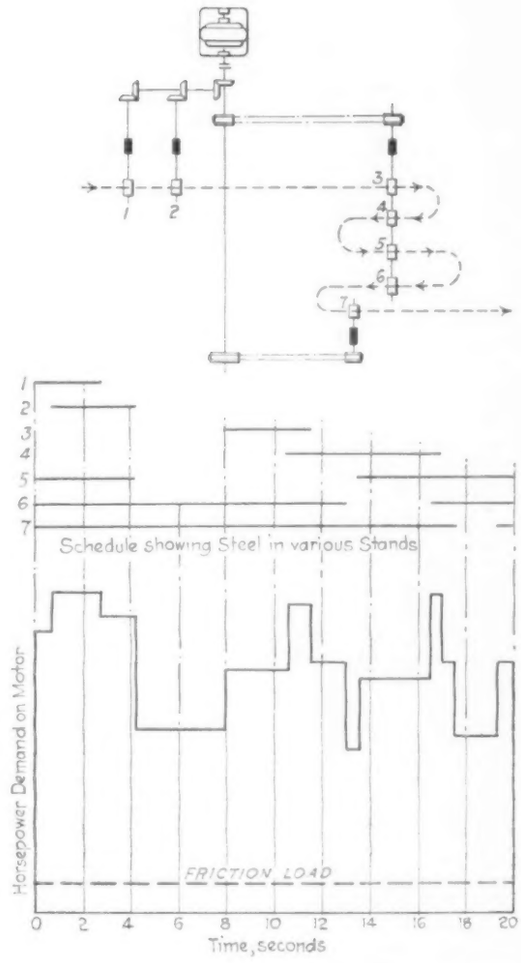


Fig. 11. Load Diagram of Combination Mill with Drive from a Single Motor. The diagram plan at top shows layout of the mill and power connections. In the middle is shown the timed schedule of steel in each of the seven stands

Some steels are hot short and the edges fray so that it is necessary to take lighter drafts and more passes.

Density of steel is a factor. The cast ingot is spongy and easily reduced. As rolling proceeds the metal becomes denser and somewhat more power is required to roll it. This action is particularly pronounced in cold rolling. The shape of the section is an important consideration, primarily with reference to the exposed area per unit of volume. Plates, for instance, expose more area than ingots and cool faster. The specific power demand therefore increases more rapidly as rolling proceeds. In the initial passes, at high temperatures, the specific power demand for different sections or pass shapes does not vary widely. In the later passes the variation is much more marked. It is characteristic of special sections, as a result of lateral displacement and forming the thin web and flanges, which cool rapidly and offer great resistance, that the power required for the later passes is relatively high.

The diameter of the rolls plays a part. A roll of large diameter requires greater pressure for a given draft because of the greater projected area of contact. The increased pressure on the roll necks increases the friction. Moreover, with a large roll there must be more slippage between roll and steel at the point of entry. Large rolls are necessary for reasons of strength and deflection, but they require more power per unit of metal displaced.

Because of the many factors involved, it is not possible to state any single value of kwhr. per unit of displaced metal to cover all conditions. Curves have been drawn from test data on various types of mills. These curves take into consideration, in a practical way, the modifying factors, particularly the rate of cooling, and serve as a guide for forecasting the requirements of proposed mills of similar character. Fig. 9 gives specific power consumption curves for a reversing blooming mill, for a three-high plate mill rolling reheated slabs and for a billet mill rolling reheated blooms.

These show, for instance, that when the piece has been reduced to about 40 per cent of its original area, the power consumed per unit displacement is roughly 150 per cent of that required for the first pass. This condition is primarily due to cooling and is therefore more marked in the case of plates and billets than with blooms, which hold their heat well. The curves are representative of zones in which fall test values from a large number of pieces. They are necessarily inexact.

The first step in the determination of motor size is the calculation of the load demand of the individual passes and the duration of each pass. The intervals between passes may be estimated, based on the character of the mill and the operation of the screw down, lifting tables or transfers, where used. Where stands or groups are operated in sequence, the slowest point determines the maximum rate of feed. The rolling schedule is based on these considerations.

With the above data available for perhaps several rolling orders, load cycle curves may be prepared by charting the loads of the individual passes and combining them where they overlap due to steel being in two or more passes simultaneously. In laying out such a chart, friction load is added, commonly considered as a constant demand. In considering load cycle charts, not only normal but possible abnormal conditions must be taken into account. The maximum possible output and probable average schedule must both be considered. The drive must have capacity to handle the maximum, at least occasionally.

If the load cycle is such that a flywheel is advisable the requirements may be determined from the chart. If a horizontal line be drawn representing maximum motor output, the flywheel must be able to supply the horsepower-seconds demand above this line. This general mode of procedure shows what effect can be obtained from flywheels of feasible dimensions. A study of the load cycle and the flywheel possibilities determines the motor requirements, both as to continuous and peak demands. Upon this information the motor selection is based.

In a continuous mill the steel enters the successive stands in rapid sequence and remains for some time in each stand. The resulting load is a sustained demand gradually applied and relieved, a most favorable condi-

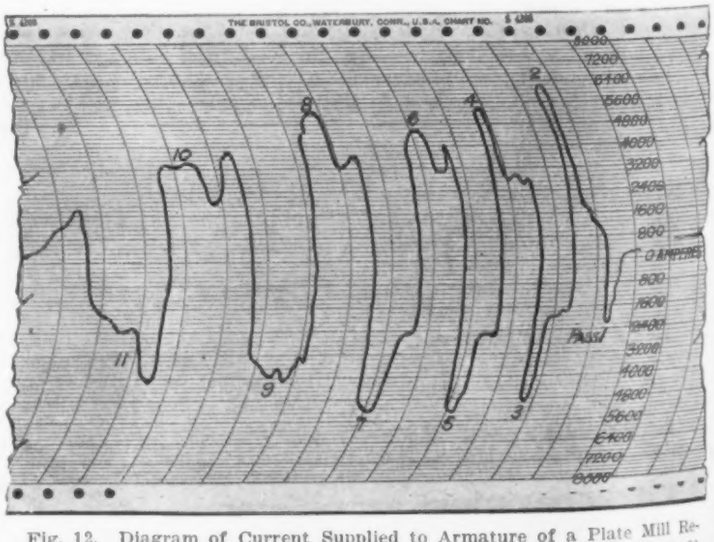


Fig. 12. Diagram of Current Supplied to Armature of a Plate Mill Reversing Motor Requiring Eleven Passes to Roll Open-Hearth Slabs 5 x 21 In. into Plate 20½ x ¼ In. The 8000-hp. motor runs at speeds up to 120 r.p.m., with current up to 600 volts. The chart speed was 6 in. per min.

tion. Fig. 10 shows the load curve of the continuous roughing stand of the 10-in. skelp mill at the Mark plant, Steel & Tube Co. of America, when rolling 7¾ x 2 in. to 7⅜ x 0.315 in. As there are no severe peaks of short duration, there is no field for a flywheel, and flywheels are seldom used for continuous mill drives. The rolling schedule on a continuous mill is quite simple and definite, so that the required motor capacity can be determined with relatively good accuracy.

In mills involving several stands in train, or in Belgian or combination type mills, the rolling schedule is less simple and the individual pass demands will ordinarily overlap in such manner as to cause a load of fluctuating nature. Fig. 11 shows the layout of a mill having two tandem roughing stands followed by a guide mill or train in which the metal is looped between stands. The schedule shows the passes and their intervals, showing at a glance how the pass loads are superimposed.

It will be noted that the finishing pass is the limiting factor. The load chart, as shown, is based on a single group drive for all the stands. If the drive other installations are of value, but allowances must be made. Some mills can handle the steel more rapidly from the furnace to and through the mill. The steel is finished hotter and requires less power.

Operators differ as to drafts and passes and eventually tend to demand all the motor will stand. As operating skill improves, more output is expected. It is difficult to forecast accurately the future conditions under which a mill may be expected to work. In due time any limiting factors will be improved and motor capacity may eventually limit the output. It is therefore almost imperative that the motor selected be liberal for the duty contemplated at the time of installation. To a moderate degree reliability also justifies liberal motoring.

Flywheels are installed on Ilgner sets and on continuous running drives where the load is of a widely fluctuating nature. Where the passes are of short duration and the intervals relatively long, a flywheel serves to best advantage. Where the load is fairly well maintained, a flywheel can benefit but little. A proper flywheel permits the use of a motor of lower

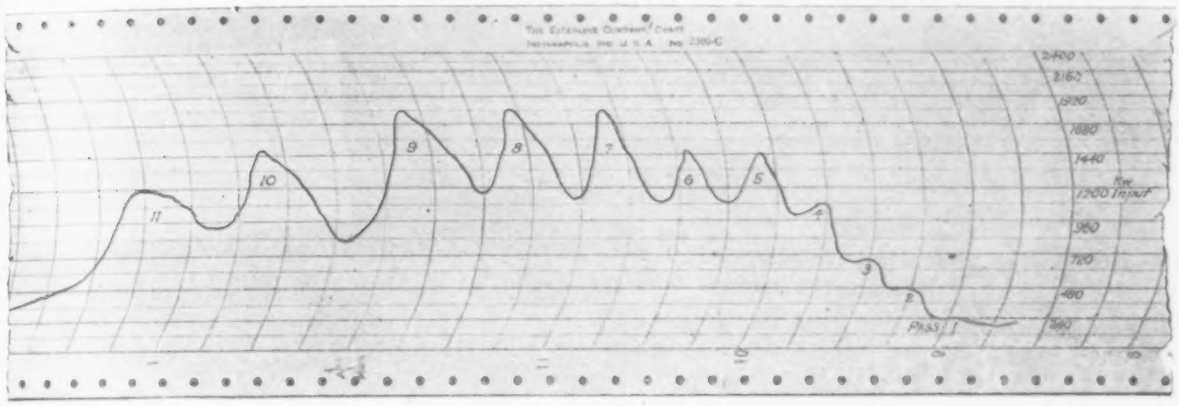


Fig. 13. Diagram of Kilowatt Input into the Ilgner Set of the Plate Mill of Fig. 12. The three-phase motor takes current at 2300 volts and delivers 1500 hp. at 360 r.p.m. The chart speed was 3 in. per min. This diagram was taken simultaneously with that in Fig. 12

were divided, the diversity factor would have less effect and the loads on the driving units would be more peaked. In a mill of this type, having separate drives for the roughing and finishing groups, it will likely be found that a flywheel may be used to advantage for the roughing drive but is not required for the finishing group.

The load on the motor driving a reversing mill involves the work done in displacing the metal, superimposed upon which is the friction load of the mill and the inertia load due to acceleration and reversal. About 30 to 40 per cent of the energy demand for a pass is for acceleration. About two-thirds of this is regained by regeneration in stopping before reversal. The nature of this load may best be seen from Fig. 12, a chart taken on the 30-in. universal plate mill at the Mark plant, Steel & Tube Co. of America, while rolling slabs 5 x 21 in. down to 0.250 x 20.5 in. The peaks due to reversal can be identified in most cases, as preceding the rolling load for each pass.

Fig. 13 shows the demand on the induction motor driving the Ilgner set. The effect of the flywheel in smoothing out the load demand is fairly evident, although more pronounced when rolling wider slabs. The load cycle of both the reversing motor and flywheel set may be computed in a manner similar to that indicated for other mill types, namely, by combining properly the component elements and by modifying for flywheel effect as selected.

In mills where passes are not superimposed, reversing mills and Lauth plate mills being examples, the power demand peaks during the first passes are high and short. The flywheel absorbs a considerable portion of this peak demand. During the later passes the peaks are lower but the demand more sustained, so that the motor then supplies about all the power required. The calculated power requirement and motor size should serve primarily as a basis of judgment. Local conditions have a bearing. Comparisons with peak capacity. Of often greater importance is the reduction of peak demands on the power system. The utilization of a flywheel requires slowing down under heavy loads. This, in turn, introduces slip losses, which are greatest at heavy loads. The slip permissible does not exceed 15 per cent, due both to low motor efficiency and difficulties in rolling with greater speed variation. The friction losses incident to heavy flywheels are an important item.

On the other hand, the increased efficiency due to better load factor at the power house may easily overbalance the added mill losses. The size of flywheel is usually a compromise. A flywheel large enough to absorb all peaks above the average load would usually be excessive in size and weight. The size of the drive in relation to the local power system has an important bearing. It is obvious that, if a flywheel is used on a drive having a range of speeds, it is less effective at the lower speeds. The selection of flywheel, motor and control should be based on their joint consideration, as they are closely related.

Motors equipped with flywheels are of the wound rotor type and employ either fixed or variable secondary resistors or a slip regulator. The use of a slip regulator affords most effective utilization of the flywheel by conserving the stored energy for use only during peaks.

Main drive motors may be direct connected to the mill or they may drive through rope, belt or gearing. Motors direct connected to the larger mills are necessarily of slow speed, many of them operating at about 80 to 100 r.p.m. Direct connected slow speed motors are of large dimensions; their efficiency and power factor are relatively low, particularly in the case of 60-cycle motors. Simplicity of drive and elimination of reduction gearing is their chief advantage.

Motors driving a group of tandem stands may drive through bevel gearing or through spur gearing or a combination of the two. Belt drives are also employed,

particularly for finishing stands, as a smoother finish is claimed, due to elimination of gear vibration. The herringbone reduction gear unit is slowly gaining in popularity. It enables the use of high-speed motors on low-speed mills. Herringbone gears are smooth in operation, eliminating largely all shock and back lash and thus relieving the teeth of much punishment. They permit wide speed ratios, if desired, and have an efficiency of about 98 per cent. The first cost of a complete geared drive is generally lower than that of a slow speed direct connected equipment, but the gear drive may require more floor space.

In the Lauth type plate mill, the central pinion in the housing may be made smaller than the upper and lower gears, obtaining a slight speed reduction. In the "Kennedy" housing the pinion is offset and larger gears are used, so that a reduction of four or five to one can be incorporated.

Many mills offer a choice between direct connection and drive through a gear unit. In some cases, notably in the sheet mill, the speed is so low that direct connection is not feasible and herringbone gearing is commonly used, so that a motor of about 240 r.p.m. may be used to drive the mill shaft at about 30 r.p.m. The use of a high-speed motor in connection with a gear unit is particularly desirable for adjustable speed drives of the constant horsepower type, where the auxiliary motor is mounted on the common shaft with the main motor.

Where a mill comprises a number of stands, groups or trains of rolls, the question of subdivision of drives is involved. Motor drive affords greater possibilities than engine drive for division of units. The principal advantages of such division are mechanical simplification and independent speed control. Isolation of the finishing rolls may also lead to better finish, through elimination of vibration.

Individual drive of the various stands of continuous mills has been suggested. Several advantages might accrue. Individual speed control would permit ready control of looping and allow adjustment for differing roll diameters, so that the exact relation required with grouped stands would not be necessary. This would reduce the variety of rolls required and permit leeway in turning individual sets. Any stand could be shut down and others adjusted to correspond. The piece could be finished in any stand and the final (later) stands stopped. Such an arrangement would eliminate considerable shafting and gearing and decrease the friction loss. These points are mentioned as suggestive of some possibilities of electric drive not yet fully developed.

The electrical efficiency of a reversing drive is necessarily a little low because of the conversions involved; it is of the general order of 66 per cent. Continuous running motors, either constant or adjustable speed, have efficiencies of the order of 85 per cent. The lesser friction losses in the reversing mill proper largely compensate for the lower electrical efficiency of the reversing drive.

Free Competition the Remedy in Coal Industry

Free competition involving "a gigantic struggle for existence" among the country's 10,000 coal mines in which "the fittest will survive" will solve the problem of too much coal and benefit the consumer, according to F. S. Peabody, Chicago, member of the American Institute of Mining and Metallurgical Engineers, and one of the leading bituminous coal men in the central competitive field. In a recent statement of his views Mr. Peabody asserted that over-development of the bituminous coal mines is adding $400,000,000 yearly to the nation's coal bill. Over-development, he figures, is costing about 80 cents on each ton of coal mined.

It is safe to say, according to Mr. Peabody, that the present developed capacity is fully one-third greater than any possible demand. The capital investment in active operations, he said, including developments and improvements and a reasonable coal acreage allocated to each mine, can be safely figured at two billions of dollars. The one-third over-development, therefore, amounts to nearly $700,000,000, on which the interest at six per cent is $40,000,000 per annum. There are approximately 700,000 men employed in the bituminous coal mines. The one-third excess amounts to 200,000 men, whose yearly wage figured at $1500 per man would come to $300,000,000.

"Under present conditions the mines must average at least 100 idle days per year. A coal mine cannot shut down on idle days without expense. Based on the actual experience of our company operating in 36 mines in 11 different districts, I figure that the cost of maintaining all of the mines in idleness for 100 days will amount to more than $50,000,000. "In dollars and cents, therefore, we have an item in the nation's yearly coal bill of about $400,000,000, which is directly caused by over-development. The normal consumption of bituminous coal in the United States, including the amount exported, is between 450,000,000 and 500,000,000 tons yearly. Over-development, therefore, is costing about 80 cents on each ton of coal mined."

"No solution has been presented that would effect the necessary cure," according to Mr. Peabody. "To those who have given the matter careful study," he said, "it would seem that the sensible thing to do is to do nothing. Under free competition, with general industrial conditions normal, the 10,000 units of the bituminous coal industry will be forced into a struggle for existence in which the fittest will survive and those least able to stand the strain of competition will be forced out.

It will take time, probably about ten years, but by allowing nature to take its course, we will have at the end of that period only the most efficient mines, able to produce coal at the lowest cost, and while the struggle for existence lasts competition can be depended upon to maintain a low level of prices. The situation is one that is bound to work directly to the benefit of the coal consumer.

Penn Seaboard—Carpenter Steel Merger Declared Off

It was announced on Aug. 5 that negotiations for consolidation of the Carpenter Steel Co. with the Penn Seaboard Steel Corporation have been definitely broken off.

It is stated that the Carpenter Steel Co. is now negotiating a merger with the Ludlum Steel Co., Watervliet, N. Y.

Iron Ore Output of Germany in 1918 and 1919

Data as to the German iron ore production in 1918 and 1919 have just been published in *Stahl und Eisen* for June 29. In metric tons they are as follows:

	1919	1918
Brown ore, under 12 per cent manganese	3,115,545	4,068,595
Brown ore, 12 to 30 per cent manganese	290,988	542,784
Manganese ore, over 30 per cent manganese	11,475	13,567
All other	2,735,826	3,289,951
Total	6,153,834	7,914,897

The average iron content of all the ores except the high (30 per cent) manganese ores, was 33.51 per cent Fe. in 1919 and 33.41 per cent Fe. in 1918.

Russian Steel Industries in 1921

Russia's pig iron, steel and rolled steel production in 1921 were as follows in metric tons, according to the *Mondliche Rundschau*, as published by *Stahl und Eisen*.

Region	Pig Iron	Open-Hearth Steel	Rolled Steel
Ural	68,518	84,373	88,976
South Russia	29,025	52,432	90,631
Central Russia	18,640	27,404	21,916
Total	116,183	164,209	201,523

German Iron and Steel Prices Sharply Up

Increase in Hematite Is 40 Per Cent—Steel Products Are Advanced 10 Per Cent—Both Accompany Fall in Value of Mark

(By Radiogram)

BERLIN, GERMANY, Aug. 14.—The Eisenwirtschaftsbund has raised the price of pig iron, effective Aug. 21, by approximately 40 per cent above the prices prevailing the first of the month. The new price of hematite is 16,767 marks per metric ton ($20.02 per gross ton, at the exchange rate of 11¾c. per 100 marks.) This parallels falling exchange.

The Steel Syndicate has raised the price of bars to 21,070 m. (1.12c. per lb.); thick plates, exceeding 5 mm. (0.20 in.), 23,660 m. (1.26c. per lb.) and other products proportionately.

German Price Trend Continues Upward

Declining Exchange, Higher Freights, Increased Export Taxes, High Wages and Costly Coal Continue to Force Advances

(Special Correspondence)

BERLIN, GERMANY, July 26.—The steel market continues active, with complaints of a decline in certain classes of exports, the cause of which is more the intense domestic demand than foreign competition. The great price advance caused by the latest decline in the mark continues. In a few days the Steel Syndicate will meet to fix new prices. The Eisenwirtschaftsbund has announced considerable increases for pig. Pig-iron prices were last fixed on July 1 to hold for the month, with the usual "coal clause," providing for an automatic increase. This increase took place, and the supplements, of 600 to 700 per metric ton, automatically came into force. The prices fixed to-day hold good for August if coal prices remain unchanged. The current and July prices are as follows, in marks per metric ton:

	August	July
Hematite	10,760*	8,265
Foundry iron No. 1	9,868	7,915
Foundry iron No. 3	9,798	7,845
Siegerland steelmaking	10,092	7,845
Spiegeleisen	11,116	8,869

All these rates are more than 100 per cent over those of March. The price of 80 per cent ferromanganese has been raised from 17,855 to 18,580 m., 50 per cent from 16,698 to 17,380 m., and ferrosilicon from 10,120 to 12,620 m. The causes of the upward movement are, indirectly the exchange, directly the increased cost of imported ore, wages, and transport. Ore not only bears the increased net cost due to the mark's lower value abroad, but also the heavy increase in import duties. In accord with a reparations commission demand that taxes should be fixed to increase automatically as the mark falls, the Government has of late altered week by week the gold supplement on import duties paid in paper marks. This week the supplement is 10,400 per cent, or 105 times the scheduled rates. Under the latest railroad freight schedule, July 1, the cost of carrying foundry pig iron is 90 times the pre-war cost, for spiegeleisen and raw steel 134 times, for shipbuilding material 234 times, and for certain wire products 309 times. These increases are for specified distances.

Prices Held Down by Official Fixing

In spite of reserve by some buyers, who anticipate a mark-exchange recovery and a consequent price-fall, the market is strong; and there is an extreme shortage of heavy material, so that were prices not officially fixed they would rise very much higher. The shortage of pig iron is aggravated by the fact that furnace employees, like the coal miners, are leaving for the building and other industries. The foreign ore supply is sufficient and there is an increased demand for native ore, which cannot be satisfied because of desertion by the employees of the Siegerland mines. The demand for manganese ore is strong, and offers are few.

The newspaper theory that the low mark exchange may check export by making the mark unsaleable abroad is not accepted by Berlin financiers and business men, who point to similar scares at earlier mark crises, and declare that as long as Germany produces goods for export her mark, however low, will be bought by foreigners. Toward the end of June there was difficulty in exporting semi-finished material, because of competition from other countries, but at present exchange this difficulty is eliminated.

The domestic demand for bars is exceptionally strong and producers who weeks ago announced a "selling embargo" have prolonged this measure, and refuse to accept orders. Wire manufacturers also report plenty of work. The engineering branches lately reported sufficient orders, but this week there are signs of a reaction. The demand for agricultural machinery has slackened, and fewer foreign orders are coming in. The same is true of machine tools, sewing machines and typewriters. The report of the Association of Foundries for the second quarter of 1922 complains that loss of workmen to other industries and shortage of materials has severely checked expansion, and that export, Eastern Europe excepted, was unsatisfactory owing to the high import duties of certain western countries. The South German foundries are enjoying uninterrupted good business, but this is partly the result of suspended production during the recent metal-workers' strike.

American Cancellation of Cutlery Orders

Conditions in the small iron and high grade steel branches are good, but active business does not everywhere prevail. The Hagen district companies report that the last mark exchange fall did not cause any increase in orders. Solingen reports cancellation of orders and expects dullness, because of alleged over-importation of Solingen goods into the United States, with a view to evading the tariff increase. Solingen prices have been rapidly rising.

The latest domestic prices are about 450 per cent over those of midsummer, 1921. Wages are also tending upward. A skilled worker who on Jan. 1 drew 11.30 m. per hr., this month draws 25 m. Solingen is helped by the fact that part of its work is done in homes, so that strict enforcement of the eight-hour day is impracticable. The demand for locks, screws and certain other small iron products has been active since the last mark fall. Coal shortage in these branches is

*This price was later raised to 11,317 marks, as shown by cablegram published on page 389, Aug. 10.

more serious than ever. The Ruhr report for June shows a new heavy drop in output.

Further Amalgamations

The Phoenix Corporation of Horde, Westphalia, is about to establish new blast furnaces and coke ovens, as well as a works for conversion of slag into bricks. Merger plans are announced between the Lorraine group and the Westphalian Mining & Coal Exploitation Co., of Horde. The Siegen-Solingen Cast Steel Co., which before the war was in poor condition, has, following reorganization, increased its capital, and combined or established relations with several important companies, including the Weyersburg Kirschbaum bicycle company, which also makes firearms, and is the only German works permitted by the Allies to produce for the army. Further expansion for Siegen-Solingen is discussed and the corporation promises to rank with the Stinnes, Phoenix, Rhenish Steel and other large groups.

Wire Nails Imported by England

At a hearing in London on the proposition to place a tariff on wire nails, Oscar Moenich is reported by *Iron and Coal Trades Review*, in part, as follows:

The reason why, previous to the war, wire nails at times were very little dearer than ordinary wire, was due mainly to ordinary market fluctuations and to the fact that wire nails offered a favorable means of disposing of a substantial quantity of steel in simple form which might otherwise not be made good use of. Wire nails often are made from wire shorts, the market value of which is below that of ordinary wire.

Imports come from Belgium, Germany, Holland, Austria, France and from the United States, which, though enjoying an appreciated currency at present, is exporting nails to England at lower prices than those of Continental makers. The imports during 1912, 1913, 1920, and 1921 were as follows:

British Imports of Wire Nails, Gross Tons

	United States	Germany	Belgium	Holland	Total
1912.....	9,974	19,726	24,962	726	55,501
1913.....	6,732	19,959	22,827	470	50,246
1920.....	8,580	4,919	15,167	1,467	43,358
1921.....	3,456	5,500	21,217	1,744	35,600
1922*.....	578	2,874	6,753	716	.....

*First three months.

The fact that a number of (British) concerns which made wire nails during the war had had to discontinue this work was due largely to unecomonical working and to their having been established too far from the wire drawing mills. A German manufacturer stated that a man would produce 7½ tons of nails per month, or 90 tons per annum, so that the total number of hands required to turn out the 10,485 tons said to have been the British manufacturers' production during 1918 would only be 120.

CHINESE MARKET DULL

Merchants Await Political Developments—British Prices Cut and Keep Buyers Out of Market —Export Figures

(*Special Correspondence*)

SHANGHAI, CHINA, July 10.—It is difficult to find any improvement in steel in China. Nearly all steel importing interests in Shanghai report that business is practically at a standstill. A recent cut of 10 shillings per ton by British manufacturers has had the immediate effect here in China of keeping Chinese buyers out of the market. While there is no decided impression that prices will decline further, still the large Chinese buyers feel that in the absence of inquiries from the interior, it is safe to await political developments before going strongly into the market at Shanghai.

Hankow imports of copper ingots from America and Japan have been sufficiently large in the past few months to call for special comment. During the period Jan. 1 to May, 1922, the total imports of American copper ingots amounted to approximately 12,847,000 lb., of Japanese copper ingots, 4,706,000 lb., and of other foreign ingots through Shanghai, 1,177,000 lb. Hankow in recent years has replaced Shanghai as the center of the copper market for Central China. This copper is used almost entirely for minting purposes.

Chinese Iron Ore Exports Decline

Last year the export of iron ore from China recorded a distinct decline from 11,292,407 piculs (1 picul = 133.5 lb.) in 1920 to 8,517,162 piculs in 1921. Antimony ore decreased by some 3000 piculs and in 1921 stood at 19,459 piculs. Lead ore, zinc ore, antimony regulus, quicksilver and spelter all showed increases in 1921 but diminutions in quantities were returned for crude antimony, iron bars, iron plates and sheets, and tin in slabs, exports of tin receding from 189,940 piculs in 1920 to as low as 103,035 piculs in 1921. Tungsten ore exports totaled 39,054 piculs last year.

Visible supplies of iron and steel are ample for the needs of the country for another three months. In some lines heavy stocks are being carried, while in others stocks in warehouses cannot be said to be large.

EXPORT BUYING LIGHT

Japanese Buying Confined Largely to Government —United States Imports Foreign Iron

NEW YORK, Aug. 15.—Export trade continues quiet, most of the buying from Japan being from Government sources. The Chinese market shows little activity. Purchases of South American countries are usually in small lots of well under 100 tons. Some pipe has been bought lately by Rio de Janeiro, Brazil.

Among the governmental and municipal inquiries in the market from Japan is a tender from the city of Nogoya, calling for bids on 2500 tons of grooved rails of 127-lb. and some 93-lb. sections, and including frogs, switches and other track accessories; bids closed Aug. 10. The Imperial Government Railways are receiving bids on 400 tons of beams. One of the large Japanese houses in New York has booked an order for 32 miles of 12-lb. rails and one mile of 40-lb. rails for shipment to Formosa. The city of Osaka has purchased 250 tons of structural material through a Japanese exporter and there is an inquiry now current for 850 tons of reinforcing bars from a private source.

Black sheet business is still dull. Lately a considerable interest has been manifested in Japan in No. 1 heavy melting steel. Some heavy melting steel has been shipped from the Pacific coast, as recently reported in THE IRON AGE, and a number of Japanese export houses are now handling inquiries for tonnages of various size. Japanese exporters here are obtaining quotations on scrap f.a.s. Boston, New York or Philadelphia, as well as f.a.s. Pacific coast ports.

Pig Iron Imports

Importations of foreign pig iron continue fairly heavy. Some export and import houses are bringing in small tonnages of Scotch iron, usually of 100 tons to an order, which is being furnished to small foundries in the New England district. One company which handles large quantities of ore and pig iron is selling foreign iron of Belgian, Luxemburg and French origin to pig iron dealers and in the past week or ten days has received shipments of about 9,400 tons at prices c.i.f. Atlantic port, ranging from $22.50 to $25 per ton, according to analysis. Scotch iron is evidently the most popular and the average quotation recently made on No. 3 Scotch iron, c.i.f. New York, has been about $26.80 per gross ton. Iron quoted at this price generally analyzes about 2 to 3 per cent silicon; 0.01 to 0.05 per cent sulphur; 0.3 to 0.4 per cent phosphorus and 0.8 to 1.20 per cent manganese.

British Pig Iron and Steel Output for July

LONDON, ENGLAND, Aug. 14 (By Radio).—The production of pig iron in Great Britain in July was 399,100 gross tons and that of steel ingots and castings 471,100 tons. These compare with 369,200 tons of pig iron and 400,200 tons of steel ingots and castings in June.

The pig iron and steel output for Great Britain by

months so far this year has been as follows in gross tons:

1922	Pig Iron	Steel Ingots and Castings
January	288,000	327,500
February	300,100	418,800
March	389,800	549,400
April	394,300	404,200
May	407,900	462,300
June	369,200	400,200
July	399,100	471,100

The July outputs of both pig iron and steel are the second largest month of the year in each case. The 1921 pig iron production averaged 217,600 tons per month and the steel output 302,100 tons per month. In 1913 the two figures were 855,000 tons and 639,000 tons per month respectively.

Swedish Pig Iron and Ore Output in 1921

The pig iron production of Sweden in 1921, according to data published by *Stahl und Eisen*, taken from *Kommersiella Meddelanden*, was 313,080 metric tons. The outputs for recent years are given as follows in metric tons:

1913	730,207 tons
1918	761,822 tons
1919	493,701 tons
1920	470,550 tons
1921	313,080 tons

The 1921 production is stated to be the lowest in 50 years. Only about half the blast furnaces of the country were in operation during the year.

The country's production of iron ore, including schlick, was 6,464,347 tons in 1921, or 43.1 per cent in excess of the 1920 production. The data for recent years follow:

Year	Mines Operating	Output, Tons
1913	295	7,475,571
1914	313	6,586,630
1915	323	6,883,308
1916	345	6,986,298
1917	388	6,217,172
1918	363	6,623,661
1919	308	4,981,110
1920	279	4,519,112
1921	240	6,464,347

Of the 1921 production 483,707 tons was "schlick," or low grade ore.

Improved Outlook for Machinery

"Within the last few weeks we have closed more machinery business than in any two months during the last year and a half," states F. C. Biggert, Jr., president of the United Engineering & Foundry Co., Pittsburgh. "It can be further said that there are now good prospects for a large volume of machinery sales, and every indication that the third quarter will close with our plants operating at a very satisfactory rate.

"For several months the roll foundries have been gaining ground and recently have been able to produce at nearly the old capacity, that is, the capacity prior to the extensions at American department, Canton. The new capacity at American represents an addition of about one-third over the previous total, and as there has not been an opportunity to develop new business to meet this additional capacity, we feel that our present scale of operation is satisfactory.

"We have been quoting very close prices and to keep busy, must continue to do this. Prices will doubtless rise; this will be mainly due to increased costs of material and labor which are sure to follow increasing demand. Increased prices due to these causes are legitimate, but increases due to carelessness, inefficiency and excessive profits are not legitimate and are to be continually guarded against in a rising market."

The company recently made a shipment of five carloads of rail rolls from its Canton plant, bound for the Tata Iron & Steel Co., Calcutta, India. This shipment represented approximately 240 tons of a total of 900 tons ordered.

Cost of living in Great Britain is estimated for July, by the British Labor Ministry, at 84 per cent above July, 1914. This compares with 80 per cent in June. The high point was reached in November, 1920, with 176 per cent above 1914; by November, 1921, this excess had fallen to 103 per cent.

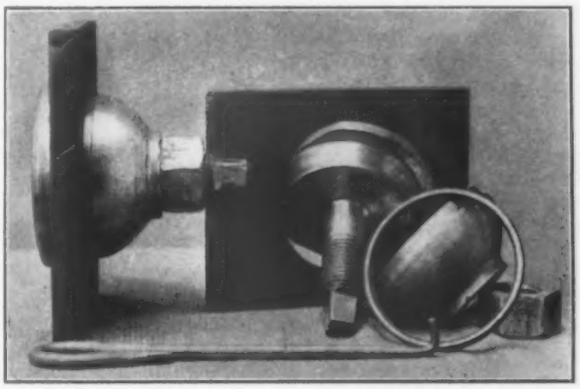
Safety Hand-Hole Plate for Boilers

The accompanying illustration shows a hand-hole plate designed for use on high or low pressure stationary or locomotive boilers and other places where a reliable hand-hole plate or plug is needed. An outstanding feature of this design is that a new gasket can be applied simply by releasing the pressure on the boiler. Each plate can be readily put in and taken out of the round hole that it closes, the hook shown being used to remove and replace plate where it is inconvenient to do this operation by hand.

A feature emphasized by the inventor is the oval flange that fits on the inside of the hole. This, it is claimed, is of suitable thickness so that it is impossible to blow it out with steam or water pressure, as the boiler would burst first. Another feature contributing to the safety of the device is the use of a metallic or copper gasket which will not go to pieces and blow out while under pressure.

There is no tendency to pull the plate through the hole by tightening the nut, as the gland on the cap simply pushes the gasket over the bevel of the plate. No strain is put on the boiler sheet. The joint is made by forcing a copper or metallic gasket over the bevel of the plate with the cap, tightening bell which has an extended gland on it of suitable depth. This cap fits over a central stud attached to a plate and by turning the nut the stud gasket is forced to find a seat against the wall of the hole, in this way making a very tight joint.

The nut can be tightened under pressure as the plate



Hand-Hole Plate for Boilers. A new gasket can be applied by releasing the boiler pressure

cannot be pulled through the hole. It is claimed that even if the stub should be broken off, danger of scalding is eliminated because the pressure on the boiler would hold the plate in place until the boiler could be emptied or the pressure blown off.

William C. Jacobs, 2011 South Seventieth Street, Philadelphia, is the inventor of the device.

New Micrometer Caliper

A new one-inch micrometer caliper, known as the No. 435 has been added to the line of the L. S. Starrett Co., Athol, Mass. It is intended as a low priced tool and is equipped with a ratchet stop if desired. The frame is drop-forged and black enameled. Decimal equivalents are marked on the thimble. The screw is 0.312 in. in diameter and the contact points 0.270 in., a construction intended to provide large wearing surface and assure long life.

In its exhibit of chains at the American Mining Congress Exposition, Cleveland, Oct. 9-14, the Morse Chain Co., Ithaca, N. Y., will have a 100-hp. chain drive in operation with rotoscope attached to show the rocker joint action as the chain enters and leaves the sprocket. A baloptican of the Bausch & Lomb Optical Co., which will show on a screen a series of chain-drive installations and views of the Morse plant will also be included.

Modern Blast Furnace Plant on the Yangtse

American Design Chiefly Followed—Assembling Costs at Hanyang Greatly Reduced—Steel Works and Rolling Mills to Be Built

BY EDWIN A. SPERRY*

WHILE the United States can point with pride to some of her model industrial plants it will be of undoubted interest to learn that there is under construction in China an iron and steel plant which has followed the lines of the most recent practice both in organization, and, as well, in technical equipment. While the plant is on no such scale as many in the United States, it reflects much credit on those who have backed the undertaking and goes far to indicate the growing tendency in China toward the progressive adoption of modern methods. It is the direct outgrowth of a careful study of economics and marks the beginning of advanced industrial undertakings in a country which has heretofore been given to unorganized effort. The location is near the well known Tayeh iron mines, descriptions of which have appeared in the technical journals. The company operating is designated as the Tayeh Iron & Steel Co. and is a subsidiary of the Han-Yeh-Ping Iron & Coal Co. which now operates the Hanyang Iron & Steel Co. at Hanyang, the Tayeh mines and the Pinghshiang collieries.

A brief history of the company and of the circumstances which led up to the establishment of this new plant will be of interest.

Fig. 1. Portions of Hupeh, Hunan and Kiangsi Provinces, Showing Plant at Hanyang and the Later Plant at Tayeh, Farther Down the Yangtse River

In 1890 Chang Tse-yung, then viceroy of Kwangtung Province, in which Canton is located, conceived the idea of establishing an iron and steel plant at Canton. Having been transferred to Wuchang as viceroy of Hupeh Province, he decided to erect the plant in that locality. As a suitable site was available at Hanyang, just across the Yangtse River from Wuchang, this location was decided upon and the machinery was brought from Canton where it had been landed, and the work of installation started.

In 1896 the plant was started up but ran for only a short time, being obliged to close down on account of the fact that suitable coke was not obtainable in China and had to be brought in from foreign countries at high cost.

Previous to this time, 1877, Sheng Sun-hwei, a prominent Chinese Government official, in his efforts to develop the mining industry of China, especially that of iron, instituted a search for workable bodies of iron ore. He soon found the Tayeh iron beds, secured the ground in which they were located and began development. These deposits had been worked some 300 years before and native smelting had been carried on, as is indicated by the name, which means "large smelter." Huge piles of slag indicate quite extensive operations at this time. The Hangyang works obtained ore and limestone from this district as there are large beds of a very pure limestone lying immediately adjacent to the ore beds.

After the shutdown in 1897 a reorganization was brought about on a more practical basis. Search was made for coal beds, which resulted in the discovery of these at Pinghshiang in Kwangsi Province. Investigation proved the coal to be suitable for coking for furnace use. Washing plants were installed and coke was made at the start in simple native coke ovens such as will be described later.

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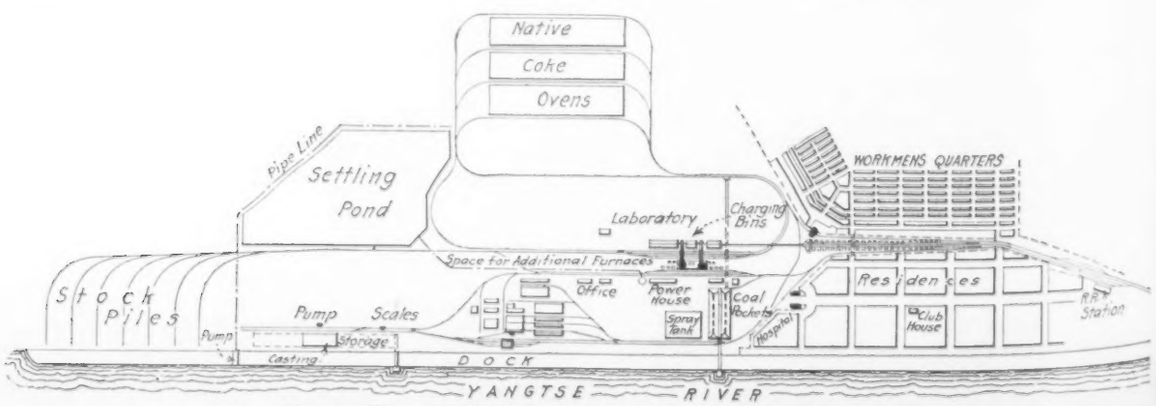


Fig. 2. Plan of Blast Furnaces, Coke Ovens and Auxiliary Plant

Fig. 4. Town from Furnace Head

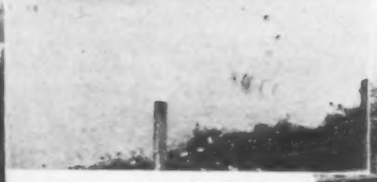


Fig. 3. Original Conditions

Fig. 5. Main Street

Fig. 6. Company Clubhouse

Fig. 7. Coal Pockets

Fig. 8. Native Coke Ovens

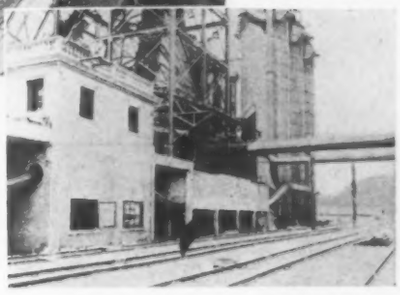


Fig. 9. Ore Bins from Coal Incline

Fig. 10. Tapping Gallery and Fan House

The plant at this time consisted of two 60-ton blast furnaces, two acid Bessemer converters and a limited rolling equipment. The product proved to be unsatisfactory, so in 1905 a Chinese engineer was sent abroad with samples of the ore, coal and coke and specimens of the steel products. The problem was submitted to J. E. Stead, who determined that there was just too much phosphorus in the ore for the acid Bessemer and not enough for the basic Bessemer process, being on an average 0.05 per cent. He advised the use of the basic open-hearth process and it has given very satisfactory results.

The coal was washed and coked at Pinghshiang and shipped partly by rail and largely by water, as the railroad line had not then been built from Changsha to Wuchang as at present. The distance from the colliery to the blast furnace was about 300 miles and the coke required two handlings after loading at the ovens. This meant high transportation costs and large losses of coke caused by crushing. The ore and flux was brought up the river, a distance of about 90 miles, by barge at a heavy transportation charge. This also necessitated an extensive barge and tug equipment.

After operating under these disadvantageous conditions for a number of years, the company was forced to work out a method based on economic conditions and finally decided to start in on the erection of a thoroughly modern plant near the mines at Tayeh and so design it as to provide for progressively additional equipment, the completed plant to consist of eight blast furnaces with a capacity of over 3000 tons of pig per day, a steel plant and adequate rolling machinery.

In 1914 Dr. Z. T. K. Woo, general superintendent at the Hanyang works, was sent abroad to study the latest developments in the industry. Owing to the war, his work was practically confined to the United States, and after a year's tour of investigation he returned to China equipped with the latest plans and ideas.

In the meantime work was organized and started in surveying and grading the site, which consisted largely of flooded areas and hilly islands as shown in Fig. 3, for which the photograph was taken from the further bank of the settling pond looking toward the upper left-hand corner of the general plan, Fig. 2. The difficulties of the work are clearly evident and the results can be seen from Figs. 4, 5 and 6.

The essential changes which will be made in the methods of operation are: First, the coal will be washed at Pinghsiang and transported by boat to Tayeh, where it will be coked near the furnaces; second, the ore and flux will be transported by rail, with a short haul from the mines and quarries, and delivered directly to the charging bins. The economy of this plan seems obvious and need not be discussed here.

Provisions have been made for receiving the coal in a large storage pocket shown in Fig. 7. This is constructed of concrete and has a system of underground roadways so arranged as to make it possible to load cars from any one of the divisions. This roadway passes under the tracks for some distance and then, by a gentle incline, rises to the loading house where it is transferred to cars in which it is delivered to the coking plant. At present the simple native ovens will be used, the design of which is indicated in Fig. 8 which shows them in process of construction. Eventually, by-product ovens will be built on the site of the native ovens and the gas from these will be used for generating electric power to be used at the plant and the mines. The coke is brought to the furnaces in buckets ready for hoisting and charging.

The ore and flux will be brought to the furnaces

over a trestle and delivered to the bins shown in Fig. 9. These bins are also of concrete, with trackways beneath. Electric trolleys operate on these tracks, bringing the material to the charging inclines in buckets ready for hoisting to the furnace head.

The water circulation is derived from a settling pond from which it is pumped to an elevated tank 46 ft. in diameter and 36 ft. in depth, with an estimated capacity of 3,600,000 gal. or 1500 tons of water. From this tank it is supplied to the furnaces and is then delivered to a spray cooling pond from which it is returned to the tank. In times of low water the supply in the settling pond is maintained by pumping from the river through the pumping plant shown near the casting house in the general plan.

The gas from the furnaces is passed through a system of dust catchers and scrubbers and will be used for the heating of the blast. The surplus will be burned under the boilers for generating power, provision having been made for this in the construction of the boiler equipment. In heating the stoves, air is provided independently of the blast air. This is accomplished by the use of a fan located in the building situated between the two furnaces of each unit pair.

The pig is tapped at the tapping gallery, Fig. 10. It is delivered to a 60-ton ladle and taken to the casting house near the river bank, as shown in the plan.

The slag will be run into a granulating tank from which it will be conveyed by means of a heavy centrifugal pump to the ponds or depressions which will be filled in this manner. This pump is located in the same building with the fan which supplies air for the heating stoves and is directly back of the granulating tank.

The present furnaces have a crucible 15 ft. 5 in. in diameter, with a depth of 8 ft. 2 in. below the tuyere level or 9 ft. 10-in. below the lower end of the bosh. The bosh is 13 ft. 2 in. high and widens to a diameter of 22 ft. The shaft has a height of 51 ft. 2 in. above the top of the bosh, which with an additional height of 16 ft. 4 in. for the bells gives a total height of 90 ft. 6 in. from the bottom of the crucible to the charging platform. The capacity is rated at 450 tons of pig iron daily.

While the plant may be considered small by comparison, it must be remembered that it was only 30 years ago that any attempt was made toward adopting modern methods and that up to that time the most primitive and crude processes were used in the production of iron in China and that to this day many of these primitive plants are still in operation.

LITTLE TONNAGE ACCEPTED

Mahoning Valley Companies Conservative About Booking Orders

YOUNGSTOWN, Aug. 15.—Little new tonnage is being accepted by Valley interests, owing to the uncertainties attendant upon production and the desire to fill as much as possible needs of regular customers. Steel companies are making every effort possible to replenish coal supplies, but are meeting with indifferent success. Whereas the ruling price on Pennsylvania coal, run-of-mine, ranges from $8 to $10, one interest reports that it purchased, within the week, 30 carloads of coal, various grades, at $6.75, f.o.b. mine. A selling interest states it has offerings at $8.50, but cannot, of course, guarantee delivery.

It is the sharp advance in coal prices which is gradually forcing steel prices toward higher ground. Current fuel costs of $8 to $10 compare with $3.25 to $3.50, prevailing prior to July 1. One Valley independent filled its May-June coal requirements at $2.35, mine, buying Southern coal. High-priced coal is now entering largely into production, and it is very evident that it is having an appreciable effect on costs.

At the moment, buying of scrap has weakened, though steel makers are using larger tonnages than usual in their open-hearth departments, owing to curtailment of iron production.

In finished lines, there is firm demand for sheets, strips, tin plate, pipe, wire nails and bars, while plate demand has shown considerable improvement. The market on plates has moved to a minimum of 2c., ranging up to 2.10c., while one maker reports it has entered some tonnage, comprising the lighter gages, as high as 2.70c. Much of the current plate demand is for boilers and tanks. A Valley interest producing storage tanks reports active inquiry, with its capacity oversold several months ahead.

The spread on sheet prices continues from 3.15c. to 3.30c. for black, and 4.15c. to 4.30c. for galvanized, with still higher prices applying on tonnages where the mills put forth special efforts to expedite delivery. All Valley interests have well filled order books.

There has been quickened demand for full finished sheets from the automobile industry, with the chief independent making no effort to supply other than its regular trade. The Newton Steel Co. is pushing the installation of six additional mills at its Newton Falls property, and expects to have them ready for production around the first of the year. No action has yet been taken by the Falcon Steel Co. to proceed with the four mill addition to its eight-mill plant at Niles, which was under consideration earlier in the year.

Operations of non-integrated sheet rollers as yet show no abatement, and managers say sufficient bar supplies are in sight to maintain rollings at a normal rate through September. Such interests are getting in coal, but are paying the higher prices.

Little headway has been made by Valley independents owning coal properties in Pennsylvania, in increasing production. An interest operating its mines open shop has less than 100 men at work, and most of these are foremen or bosses. Production costs are increased by the necessity of maintaining guards.

As yet there has been comparatively little interruption to the outbound movement of steel products. Some Valley executives are more apprehensive, though, over shortage of cars, upon ending of the strikes, than ability to secure coal.

Valley furnace operators say indications point to an ample ore supply through the winter months and until the opening of navigation in 1923. Movement of ore over the Great Lakes routes has been substantial this year and it is expected furnace yards and lake docks will be well stocked by the close of navigation.

Steel Corporation's Unfilled Orders

The unfilled tonnage reports of the United States Steel Corporation for July showed 5,776,161 tons at the close of that month, or 140,630 tons more than reported on the books June 30, and the largest amount reported since April 30, 1921, when unfilled orders stood at 5,845,224 tons. The increase last month compares with one of 381,303 tons in June, 157,315 tons in May and 602,765 tons in April, and decreases of 353,079 tons, 100,609 tons and 26,736 tons in March, February and January, respectively. On July 31, last, the Corporation had 945,837 tons more of unfilled business on its books than it did a year ago. Following is the unfilled tonnage as reported by months since January, 1920:

	1922	1921	1920
Jan. 31	4,241,678	7,573,164	9,285,443
Feb. 28	4,141,069	6,933,867	9,502,092
Mar. 31	4,494,148	6,284,765	9,892,073
Apr. 30	5,096,917	5,845,224	10,358,747
May 31	5,254,228	5,482,487	10,940,465
June 30	5,635,531	5,117,868	10,978,857
July 31	5,776,161	4,830,324	11,118,468
Aug. 31	.....	4,531,926	10,805,038
Sept. 30	.....	4,560,670	10,374,804
Oct. 31	.....	4,286,829	9,836,852
Nov. 30	.....	4,250,542	9,021,481
Dec. 31	.....	4,268,414	8,148,122

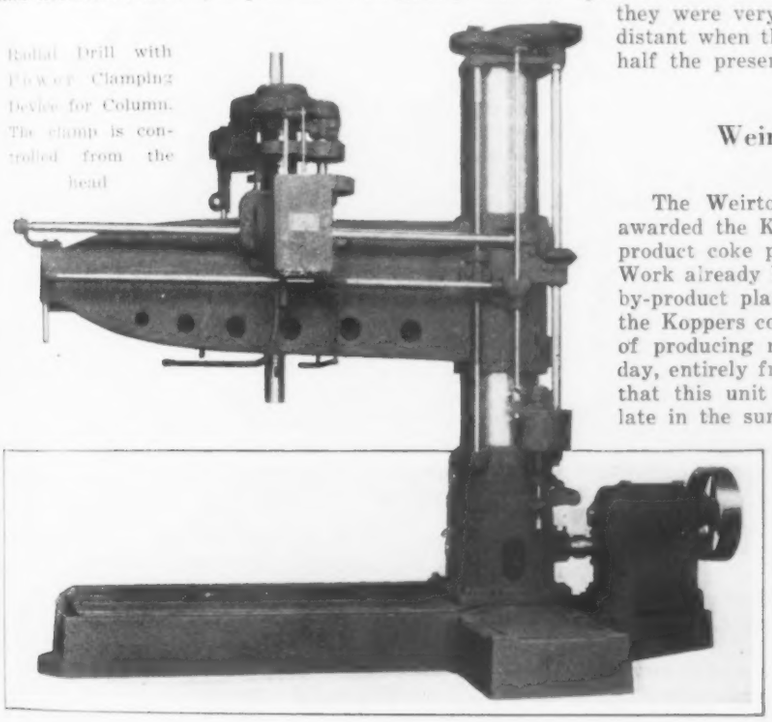
The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

The Steel Co. of Canada, Hamilton, Ont., is making extensive repairs to one of its blast furnaces, another of which has just been repaired and is ready to be blown in at any time.

Drill with Power Clamping Device

In drilling at the extreme end of the arm on a large radial drilling machine it is inconvenient for the operator to leave his place and tighten the swinging column with the arm at each shift of the drill. To obviate this, the Dreses Machine Tool Co., Cincinnati, has brought out a power column clamping device arranged as shown in the illustration. It was developed, it is said, because although pneumatic devices for this purpose have been successfully applied, not all shops have compressed air, and where it is available the piping to the machine is frequently expensive and inconvenient.

The device receives its power from the vertical driving shaft, which extends through the oval box. By means of friction clutches the screw below the box runs right or left handed, and a nut, to which is forked a lever, works on this screw. The hub of the lever is tapped and works on the column binding screw. The engagement of the friction clutches in connection with the screw is accomplished by a cam located on top of the box. The cam is operated by the splined vertical and horizontal shafts, a pair of bevel gears, and the lever and links attached and moving with the head, as shown. The friction clutches are self releasing and also slip at either end of the tightner-levers movement.



Radial Drill with Power Clamping Device for Column. The clamp is controlled from the head

The arrangement does not interfere with the hand-column clamping device in front of the column.

Manufacture of Pig Iron in New Zealand

According to the *Dominion* (New Zealand) the first tapping of the blast furnace at Onakaka took place on April 27. This furnace was erected by the Onakaka Iron & Steel Co., Ltd., which was formed for the purpose of developing a part of the extensive iron ore deposits of Golden Bay. The company, which has installed a modern plant for the production of pig iron, has its own supplies of coal, iron ore and limestone, and is able to get the ore and the limestone in an open quarry opened out not far from the furnace. The furnace is now, it is reported, running smoothly, no difficulties being encountered, and is tapped about every 8 hr.

As the furnace settles down to work, about 8 to 10 tons of pig iron per tap will be produced. The expert in charge is reported to be well satisfied, and to say that the iron produced is all that could be desired, and quite up to the desired quality.

Costs of raw materials, per ton of iron at the furnace, including royalty, labor and transportation are reported to be: Iron ore, 12s. ($2.70 at $4.50 per £1); limestone, 3s. (67½c.); coke, £2 ($9). Labor is not more than 15s. ($3.37½). It is estimated that coal from the company's mine, when opened up, will cost not more than 15s., including royalties, at the works.

The Basset Direct Steel Process

Whatever may be the future of the Basset direct process of steel making, it is clear that a large number of shareholders in the company are not satisfied with the complete absence of practical results, says the *Engineer*, London. M. Basset admits that there have been technical difficulties, which, he says, are all being overcome. There has been trouble with the linings of the rotary furnaces which were unable to stand the extremely high temperatures necessary for the success of this process. M. Basset also confessed at the general meeting that he is at present unable to produce steel to specification. This, he said, depends solely upon the furnace. Although large works have been equipped for the production of Basset steel the process has not yet entered the industrial phase but, said M. Basset, they were very near it, and the time was not far distant when they would be producing steel at one-half the present cost and exporting it to England.

Weirton Steel Co. to Build By-Product Plant

The Weirton Steel Co., Weirton, W. Va., has awarded the Koppers Co. a contract to build a by-product coke plant and motor fuel recovery plant. Work already has begun on the first battery of the by-product plant which will consist of 37 ovens of the Koppers company's new design, with a capacity of producing more than 600 net tons of coke per day, entirely from high volatile coal. It is expected that this unit will be completed and in operation late in the summer of 1923. Ultimately the plant will consist of three batteries of ovens.

The design of the ovens to be built at Weirton is the same as that of the five-oven battery which has been in operation at the plant of the Chicago By-Product Coke Co. for the past six months. Each oven will have a capacity of more than 14 net tons of coal per charge. This new type of oven is about 14 in. wide and embraces an entirely different system of heating than the old Koppers design. The ovens are so arranged that at any time they can be heated with either blast furnace or producer gas. thus releasing all the valuable coke oven gas for use in the steel works. The Chicago plant, with ovens like those to be constructed at Weirton, has been operating on an average coking time of 12 hr. and has been on as low coking time as 9 hr. 50 min.

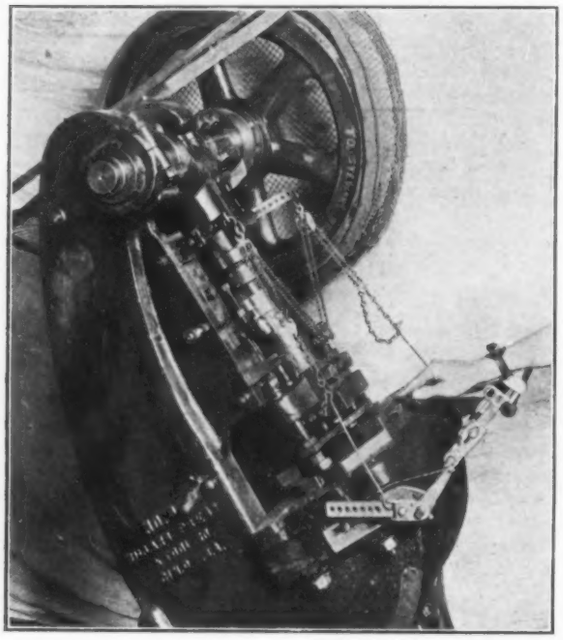
Valuation Engineers Wanted

WASHINGTON, Aug. 15.—The collection of the income tax becomes a complicated affair after it passes the point of figuring the return of the average wage earner. The technical staff of the Bureau of Internal Revenue is in need of valuation engineers in general mining, coal mining, oil and gas, and the forest industry. The positions pay from $3,600 to $4,800 a year. The United States Civil Service Commission will receive applications until Oct. 1. No written examination will be given; the ratings will be based upon education, training, experience and physical ability. The duties involve estimation of quantities, market values, value of equipment, cost of development, etc. Information and application blanks may be secured from the commission at Washington, D. C., or the civil service board at the post office or custom house in any city in the United States.

Device for Safe Operation of Presses

A safety device for use in connection with presses and drop hammers, and which is a departure from those controlled by a trip arrangement or operated by a side sweeping motion, has been placed on the market by the Gibbons Engineering Co., Worcester. It is said to be adaptable to any type of press, having any type of die.

The device is shown in the illustration attached to an inclinable press. It consists of two housings attached to the right and left sides of the platen of the press, which support a shaft that holds a right- and left-hand rocker bar or lever, the bar being keyed to the shaft. Two adjustable uprights hold the safety bar. Two independent and specially made chains, intended to assure the operator double protection, are attached to



Safety Device Installed on Inclinable Press. The safety bar can be regulated for various work

a perforated rocker lever arm as shown, and at a length equal to that of the press stroke, giving an angular motion of 6 in. The chain, after going through the pulleys, is placed in two open slots on a ram nut, and can be detached instantly. The ram nut can be attached at any convenient place over the slide-nut rest. This arrangement gives ram control.

A wrist strap with a metal part attachment on the under side is provided, as shown, the strap being made so that it will not twist on the wrist or slide on the operator's arm after adjustment. When adjusted it rests against the safety bar while the operator feeds work into the press. The safety bar having an angular motion controlled by the motion of the ram traverse, the operator's hand is removed from the danger zone on each downward stroke of the ram, by a natural backward movement, instead of a sweeping movement across the press. The wrist attachment also prevents the operator's hand from going into and over the die too far. Where a press is not provided with a standard non-repeating clutch, and the ram descends for any reason, the safety bar forcibly removes the operator's hand.

The backward-and-away-from the die motion of the safety bar can be regulated for any kind of work or for any physical characteristics of the operator. Regulation is by the safety bar itself and the side housings.

The Union Steel Corporation of South Africa is reported by the London *Ironmonger* to be busy, and although prices are being cut, it is prepared to cut still further in order to hold all the South African trade possible. It is now rolling 45-lb. rails, for which there is a fair demand, and before the end of the year it expects to be rolling girders and channels.

Unusually Heavy Building Construction

More industrial building construction was started in July than in any other month since November, 1920, according to figures compiled by F. W. Dodge Co. The amount is given as $31,882,000, or 9 per cent of the month's total of $350,081,000 for all building operations. The total is 2 per cent above that for June, 1922, and 65 per cent over that for July, 1921. It is greater than any previous monthly total except the record figures for April and May of this year, and marks the fourth successive month of unprecedented building activity.

Building contracts in the district comprising Illinois, Indiana, Michigan, Wisconsin, Iowa and Missouri, amounting to $124,655,000 in July, gave the largest monthly figure ever recorded. Construction in this district during the first seven months of 1922 has amounted to $595,668,000, or 29.2 per cent of the total of $2,041,065,000 for the 27 states covered (everything north and east of a line from Topeka, Kan., to Savannah, Ga.) The total is 60 per cent above the figures for the first seven months of 1921.

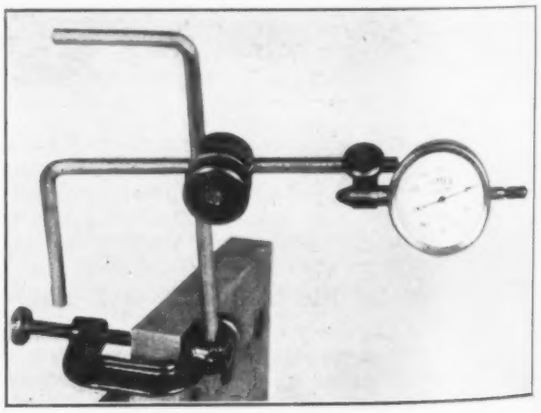
Drill Steel Survey

The comprehensive field survey conducted by the Bureau of Mines and the Bureau of Standards to determine the present status of heat treatment and breakage of rock drill steels has been completed. C. Y. Clayton and H. S. Burnholz, the investigators, recently visited some twelve mines. Data were collected from these mines on heat treatment, kinds of drills and steels in use, etc. A detailed report will be sent to the superintendents of the mines visited and it is probable that comprehensive reports giving the results of the investigation will be issued later as Government publications, to be available to the general public.

Universal Attachment for Dial Gage

An attachment, known as the Junior universal, for use with its Junior dial cylinder gage outfit, has been placed on the market by the B. C. Ames Co., Waltham, Mass.

The component members of attachment may be noted from the accompanying illustration, which shows also the set-up for proving the straightness of valve



Universal Attachment for Dial Gage Set Up for Checking Valve Stems

stems. It clamps in any position permitting gaging at any angle and may be attached to any object that will fit between the jaws of the clamp.

Indicating straightness of crankshafts, camshafts, thickness of piston rings and thickness of other material such as shims, bearing liners, etc., are among its uses. It can be used also in ascertaining the diameter of pistons and indicating the truths of fly wheels, gearbox shafts and angles. The universal attachment in connection with the dial cylinder gages provides a complete testing outfit, but where the cylinder gage feature is not required the attachment may also be used with the company's dial gage head.

Notes on Basic Electric Furnace Operation

Grade of Lime Necessary—Reducing the Phosphorus and Sulphur—Malleable or Gray Iron Castings—High and Low Tap Voltages

BY CHARLES WELLMAN FRANCIS

IN an article published in the preceding issue of THE IRON AGE* the author discussed briefly the charging of an acid furnace heat. This same method will apply to the basic furnace with the exception that in basic practice a certain amount of lime to form the oxidizing slag is either charged with the scrap or added after the charge is partly melted. The best grade of lime for this purpose is a metallurgical lime, high in calcium oxide and low in magnesia, as a high magnesia content will tend to make the melting sluggish and the slag formed will be heavy and hard to manage.

Removal of Phosphorus and Sulphur

An oxidizing atmosphere must exist in the basic electric furnace before the removal of phosphorus is possible, lime being the agent to promote this condition. The phosphorus in the steel having a greater chemical affinity for oxygen than the calcium of the lime, unites with the oxygen to form phosphoric pentoxide which is held suspended in the slag, this reaction taking place under fairly low temperature conditions. When the scrap is completely melted, this slag is drawn off as completely as possible. When a poor grade of scrap has been charged or a scrap high in phosphorus, and an extremely low specification for phosphorus is to be met, as is sometimes necessary with the finest grade of alloy steel castings, it is often necessary to throw another blanket of lime over the molten bath for the further removal of phosphorus. This slag is likewise removed and analysis shows that the phosphorus content is now extremely low and that we can proceed further with the heat.

The next procedure is to remove the sulphur in the steel. To accomplish this the exact opposite conditions must be attained, namely, a reducing atmosphere in the furnace which is obtained by a deoxidizing slag. The chief agent in obtaining this condition is carbon which is used in the form of ground petroleum coke, because this type of coke is the purest and has the lowest sulphur content. A mixture of lime and ground petroleum coke is then thrown on the bath to form this deoxidizing slag.

Steel chemists are still somewhat in doubt as to the exact chemical reaction which takes place at this point, but it is generally conceded that some of the carbon unites with the calcium of the lime to form calcium carbide while the remainder combines with the oxygen to form carbon monoxide and carbon dioxide. In 15 to 20 min. a test of this slag is taken from the furnace on the end of a hook and if its ingredients are right it will appear as a black, spongy mass which on being exposed to the air disintegrates and crumbles away to a grayish white powder which smells strongly of calcium carbide. This slag is known as the carbide slag or white slag, and its presence indicates that sulphur has been eliminated to a high degree. The existence of this slag indicates a state of chemical equilibrium, so to speak, and so long as the slag can be kept in this condition the analysis can be held constant for an indefinite time. An analysis taken at this time will be accurate and representative of the underlying metal and is the basis for figuring the final ferroalloy additions.

Non-Removal of All Oxidizing Slag

There is one essential point regarding the above process which cannot be emphasized too highly; that is the importance of the removal of all of the oxidizing slag before the deoxidizing slag is added to the bath. If some of the first slag be allowed to remain on the bath when the second slag is added, the phosphorus which is being held suspended in the first slag as phosphorus pentoxide will be liberated because of the fact that the carbon in the second slag has a greater chemical affinity for oxygen than does the phosphorus. Carbon dioxide will be formed and the phosphorus thus liberated will once more enter the steel, and probably raise the phosphorus content above the desired specification.

The following actual example will illustrate this fact in a very marked manner: The writer was called upon to meet a specification of 0.020 per cent phosphorus or under and the only available scrap for the purpose was automobile turnings, which during the period of the war were actually analyzing as high as 0.11 per cent phosphorus. Needless to say that it required anywhere from two to five oxidizing slags to bring the phosphorus to a point within reason. We found that it was necessary to get a phosphorus test analysis of 0.008 per cent to 0.01 per cent before we could proceed with the heat because, when the slag under which this test was taken was removed and the deoxidizing slag added, we found that the average pick-up of phosphorus was enough to bring the final phosphorus analysis just within the specification of 0.020 per cent in many instances. This increase was due to the liberated phosphorus from the oxidizing slag, brought down into the bath by the carbon in the deoxidizing slag, as certain portions of this slag adhere to the banks and are next to impossible to pull out of the furnace.

Gray Iron Castings and the Basic Furnace

The higher the carbon content the easier it is to obtain the white or desulphurizing slag. This is one of the reasons why the basic electric furnace is an ideal means for making pig iron, malleable or gray iron castings in view of the fact that high sulphur cannot exist in the presence of high carbon on a basic bottom. Thus iron practice in the basic electric furnace resolves itself into one operation, namely, that of removing the phosphorus. At this point, however, we encounter considerable difficulty in some instances because the removal of phosphorus cannot be facilitated to any high degree in the presence of a high carbon content. Hence in the manufacture of irons where it is out of the question to secure a low-carbon melt, a low phosphorus scrap for charging must be resorted to, and iron practice in general becomes a melting and recarburization process.

In making the ordinary grade of medium steel for castings on a basic bottom it is seldom necessary to use more than one slag, provided a good quality of scrap is used in which the phosphorus analysis shows a basic specification. In some cases, however, where the melt down shows a dirty slag, it is often advisable to remove this slag, as the white slag has a tendency

*In the issue of July 27, p. 201, the author discussed the choice of an electric furnace; in the issue of Aug. 3, p. 277, the economy features of electric foundry design and equipment, and in the issue of Aug. 10, p. 345, acid electric furnace practice.

to make a quicker appearance under these cleaner working conditions.

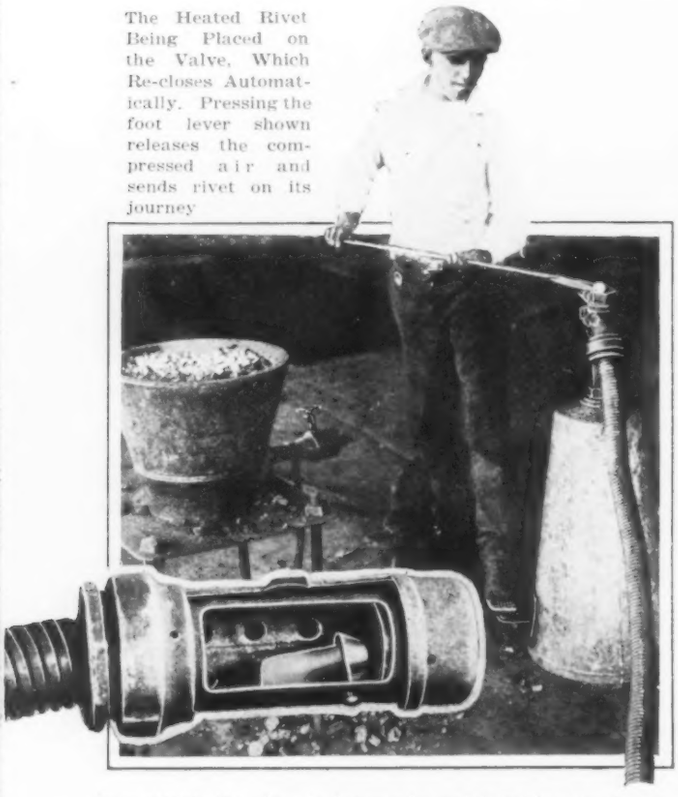
High and Low Tap Secondary Voltage

Some of the present day furnace builders have their equipment so designed as to supply the secondary voltage at two distinct values, or high and low tap as they are respectively termed. This feature has a decided advantage for basic operation in that it permits the use of a short arc on the low tap connection which is made use of after the heat has been melted and the deoxidizing slag has been added. With the lower voltage a better control of the metal temperature is assured, resulting primarily in longer life of the refractories due largely to the fact that the short arc, being partly smothered by the puffy basic slag, causes considerable less reflection on the roof and side walls. On the other hand, the long arc caused by the high tap connection is stronger and tends to scatter the slag away from the ends of the electrodes, thus baring the metal in spots and causing a stronger reflection to play on the roof and side walls which will tend to make them drip in a short time, to say nothing of burning the carbon out of the deoxidizing slag as can be readily seen by the dense black smoke which arises through the electrode eyes. With the proper adjustment on the switchboard rheostats, the heat can be held under the short arc for an indefinite period without detrimental effect on the refractories.

Basic electric furnace practice differs greatly throughout the country, and it is rare to find two shops who make use of identically the same practice. This is due in many instances to the difference of opinion of steel melters, local conditions as applied particularly to the scrap market, and the class of work handled by the various shops.

Passing Rivets with a Rivet Gun

The accompanying illustration shows a Penflex rivet gun of the Pennsylvania Flexible Metallic Tubing Co., Philadelphia, in use at the yard of the New York Shipbuilding Co. The components of the rivet passing outfit shown are a compressed air tank, a foot treadle mechanism to release the air, a compressed air inlet, shown at the right side of the tank; a head or body into which the rivet is inserted; metal tubing for transmitting the hot rivets, and a receiver into which the rivets are shot.



The Heated Rivet Being Placed on the Valve, Which Re-closes Automatically. Pressing the foot lever shown releases the compressed air and sends rivet on its journey

The gun and the forge are conveniently located in an out-of-the-way place and the tubing led to the job. As each rivet is heated and ready to be passed it is set by the heater on a valve provided in an opening contained in the head of the gun. The rivet opens this valve by its own weight and enters the machine. The valve recloses automatically and the rivet is sent on its journey simply by pressing the foot treadle. The latter operation releases the compressed air, which has been supplied to the tank, into the head of the machine, and speeds the hot rivet through the flexible tubing. The rivet is shot into a receiver at the other end, where the holder-on removes and inserts it in the hole.

The rivet gun has a distance capacity of 125 ft.. delivering rivets up or down at the rate of 50 ft. every three seconds. It is claimed that the gun has even exceeded this performance, shooting rivets 180 ft. in nine and a fraction seconds without subjecting the rivets to change in temperature.

One of the outstanding advantages afforded by this equipment is that it eliminates the necessity of placing rivet forges in closed compartments, keeping the fires and their fumes out of closed places to the benefit not only of the riveting gang, but also of other workers there. Delivering heated rivets to points of operation difficult for direct passing facilitates work in inaccessible places, and passer boys are not needed. As to air consumption, data furnished would indicate that this equipment does not materially increase the total requirements of compressed air per rivet on new construction and a substantial reduction in rivet passing costs is claimed by the makers. Prevention of a high percentage of accidents in bridge building and structural work caused by faulty rivet passing is also a feature. The equipment is particularly adaptable to building steel masts in place.

Agents for Caucasian Manganese Ore

The Association of Manganese Ore Miners of the Caucasus, in which the Georgian Government holds a substantial interest, has appointed the Iron & Ore Corporation of America, 11 Broadway, New York, agent for the United States for all manganese ore coming from the Caucasus. Paul G. Leoni, president of the company, who recently returned from a two months' business trip to Europe, told in an interview with THE IRON AGE of having completed negotiations by which the Iron & Ore Corporation of America will handle all sales of Caucasian manganese ore and manganese dioxide in the United States.

Under the regulations of the Georgian Government, which controls the manganese fields in the Caucasus, all exports must pass through the Association of Manganese Ore Miners of the Caucasus, in which the government holds a substantial financial interest. Three cargoes of manganese ore, with an average analysis of 53 per cent manganese, were delivered at Baltimore in July.

Fuel oil is now being employed by the N. & G. Taylor Co., at its open-hearth furnace plant at Cumberland, Md., and by running emergency pipe lines to other departments of the works, it expects to reduce materially the need for coal. As it is, the company reports a stock of coal sufficient for full operation for six weeks and that changing over to using fuel oil will allow the plant to run several months with its present stock of coal.

Five 100-ton open-hearth furnaces are to be built by Alex Laughlin & Co., Pittsburgh, for the Wisconsin Steel Co., South Chicago. These furnaces are to be housed in an addition to the plant now in process of erection. The melting units are of heavy design, embodying modern features of regular furnaces.

Anti-Friction Bearings in the Steel Mill

Arguments For and Against Their Use—They Avoid Oil and Reduce Wear and Maintenance Cost—First Cost Is Heavier

BY A. M. MAC CUTCHEON

(*Concluded from page 355, Aug 10*)

WHILE the history, manufacture and application or mounting of anti-friction bearings may be of interest to the engineer, the real question he wishes to consider is, what are the advantages of such a type of bearing, and what are the disadvantages. These are presented in summary form, compiled from information received from bearing manufacturers and from users of this type of bearing.

Advantages

1—Absence of oil. Steel mill electrical engineers have estimated that oil is responsible for 60 to 90 per cent of their motor troubles, causing injury to insulation, short circuiting of commutator bars, gumming of commutator, collecting dust and a general unsightly condition. The lubricant is more easily retained in a ball or roller bearing than in a sleeve bearing.

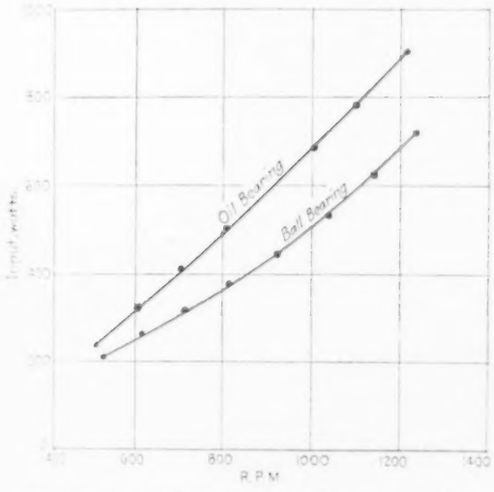


Fig. 11. Comparison of Losses Between a Ball Bearing and an Oil Bearing Motor. Each motor was 7½ hp., 230 volt, 800 to 2400 r.p.m.

2—Reduction in maintenance cost. Much less frequent attention need be given to the lubrication of a ball or roller bearing. The weight of evidence received from users of anti-friction bearing motors is to the effect that failure of bearings is much less frequent than on oil-ring bearing motors.

3—Reduced wear of the bearing, resulting in less frequent renewal, due to the lowering of the rotor, and the consequent decreased air gap at the bottom. This consideration is of particular importance on induction motors, with their necessarily small air gaps.

4—Increased efficiency. A record was presented of a test on a 5-hp., 1800-r.p.m. induction motor. Three motors were used, one equipped with ring oiler bearings, another with waste packed bearings and the third with ball bearings. The test showed the following efficiencies:

Ring oiling bearing	81½ per cent
Waste packed	80½ per cent
Ball bearing	84 per cent

Figs. 11, 12 and 13 represent the results of tests conducted under the direction of the writer. In the first case, Fig. 11, two motors normally rated at 7½ hp., 850 r.p.m., with 9¼-in. diameter armatures, were at different times belt driven by the same motor. One machine under test was equipped with oil-ring bearings and the other with ball bearings; in all other ways they were identical. The watt input represents not only the friction and windage losses of the machine under test, but also the losses of the driving motor. However, since the driving motor was the same in each case, the difference between the losses will represent the saving of the ball bearing over the oil-ring bearing.

The second case, Fig. 12, represents a somewhat similar test conducted on three motors, normally rated 30 hp. at 850 r.p.m. Motors were identical excepting the bearings; one was equipped with oil-ring bearings, a second with Hyatt roller bearings and the third with Hess-Bright ball bearings. In this test the losses of the driving motor were deducted from the watt input, and the only inaccuracy is that the losses shown include the belt loss. It is interesting to note that, at slow speeds, the reduction in loss with the use of ball bearings is not nearly so apparent as at high speeds. It is further interesting to note that the loss with roller bearings falls between the loss with oil bearings and with ball bearings, and more closely follows the line of the oil bearing loss at the high speed.

The third case, Fig. 13, represents the test on the same three motors, showing the number of seconds that the armature would rotate after shutting off the power, plotted against the speed. The results in this test closely checked in quantitative value the tests represented in Fig. 12. Sufficient tests have not been made to present conclusive evidence, and many more should be conducted, but so far as the investigation has proceeded, it appears certain that motors equipped with anti-friction bearings save power.

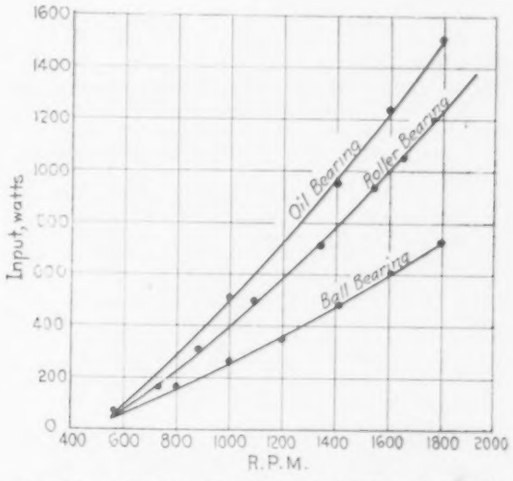


Fig. 12. Windage and Friction Losses of a Ball Bearing, a Roller Bearing and an Oil Bearing Motor. Each motor was 15 hp., 230 volt, 400 to 1600 r.p.m.

5—A considerably decreased torque may be used at starting. In the case of an oil-ring bearing, sufficient torque must be applied to break the contact of the shaft on the bearing metal before the oil film is established.

6—Anti-friction bearings make possible a considerable reduction in the overall length and in the weight of the end housing. Babbitted bearings are usually designed with the bearing length 2½ or 3 times the shaft diameter, whereas the length of the ball bearings is usually not over one-third of the shaft diameter. A ball bearing manufacturer states that a tabulation of standard motor sizes

proves that the overall length can be reduced on an average of 15 to 20 per cent, by the use of ball bearings.

7—Information received from the railroads, the government and the steel mills, which have experimented with anti-friction bearings, indicate that these bearings have been successful; this experience should certainly be classed as a strong argument for the use of such bearings.

Disadvantages

1—Cost. The first cost of the motor will be greater, and two lines of motors will have to be manufactured, so long as the users of motors are not unanimous in opinion. A user changing to the anti-friction type of bearing, will have to carry two lines of spares until all of the oil-ring bearing motors have worn out or been replaced.

2—Difficulty in making replacements. It does not seem that it will ever be possible to replace a ball bearing so easily as an oil-ring bearing. To secure proper operation, it is necessary that the inner race be tight on the shaft, which prevents its easy removal. For steel mill operation, it

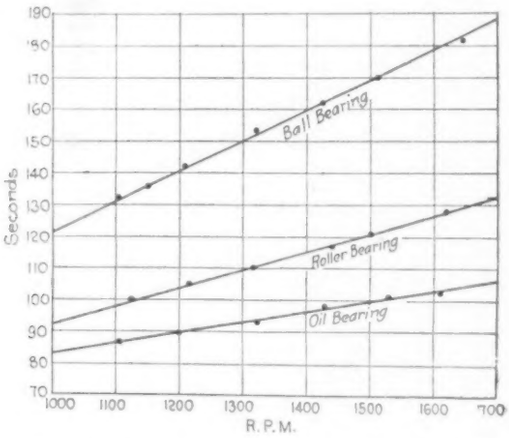


Fig. 13. Comparative Motor Drift of a Ball Bearing, a Roller Bearing and an Oil Bearing Motor, Showing the Period Taken by Each Motor to Become Stationary, After Power Was Shut Off, from Speeds of 1100 to 1650 r.p.m.

may be necessary to carry complete armatures with bearings assembled. This would certainly not be justified unless the reduction in the number of bearing troubles more than compensated for this extra expense.

3—The care necessary in successfully mounting anti-friction bearings and assembling the armature in the frame. The oil-ring type of bearing does not require the careful assembly needed with an anti-friction bearing.

4—It is essential very carefully to protect anti-friction bearings in handling and installation. This is readily recognized as a disadvantage in steel plants.

5—The workman in the steel mill is unfamiliar with the mounting of anti-friction bearings, and the assembly of such motors. This must be charged up as a disadvantage, until the average worker becomes sufficiently familiar with this type of motor to be able to disassemble it without difficulty or detailed instruction.

6—In cases of armature grounding, current may pass through the balls or rollers and the races, causing pitting; in extreme cases actually fusing the race to the balls or rolls.

7—Under emergency conditions, where a spare bearing is not available, the oil-ring type of bearing may be babbitted or cast by any reasonably good workman. This is not possible with the anti-friction type.

8—The strongest argument against the use of the anti-friction bearing, or any other device, is the fact that it has not been thoroughly proved under actual operating conditions. Whether or not the anti-friction bearing will stand up as well as the oil-ring bearing under shock and unusual load conditions has not yet been conclusively demonstrated. Until the case for the anti-friction bearing has been firmly established, it must be recognized as being on trial.

Experience in Steel Mills

Some experience has already been gained by certain steel plants, and with their permission specific reference is made to their experience. The list is not complete.

The Youngstown Sheet & Tube Co. has equipped several crane motors with roller bearings. The company has also changed certain other motors over to ball bearings, and has bought some ball bearing motors. Experience so far has been satisfactory. The engineers feel that there are certain advantages in the use of anti-friction bearings, and so far have experienced no trouble, but do not feel that the bearings have been in operation sufficiently long to determine definitely that they are entirely satisfactory in heavy steel mill service.

The National Tube Co. has in operation at McKeesport a few small vertical motors with ball thrust bearings, which have given good satisfaction.

The Bethlehem Steel Co., Bethlehem, Pa., has replaced sleeve bearings with ball bearings on a motor driving a shear. Trouble with the sleeve bearing occurred, due to the fact that at each operation of the shear a shock was transferred back to the motor, and caused the oil to be forced out of the bearing, allowing it to run dry. Ball bearing motors have performed very well on the service. The company has also applied ball bearings to motors used in connection with grinding tools, where it was necessary to operate the motor in positions such that the oil would run out of the oil well. This application has been in operation for two years without any attention.

The electrical engineer feels that the success or failure of ball bearings in connection with motors depends largely on using balls of ample size to carry all pressure, and feels that a double row of balls should be used. The only argument that he advances against ball bearings is that, in case of failure, the bearing must be replaced with an entirely new bearing, or at least with a new set of balls. If the spare parts were not available, the motor would have to shut down, whereas if the sleeve bearing were used and no spare were available, it would be a comparatively simple matter to take out the old bearing, rebabbit and put it back into service. This, however, he considers to be offset by the fact that the sleeve bearing will wear out in a much shorter time than the ball bearing. With proper attention to the selection of the bearing, anti-friction bearings can be used probably more successfully than sleeve bearings.

The Carnegie Steel Co., Duquesne works, has equipped a number of motors with anti-friction bearings, and the experience gained in operating these motors over a period of two to six years indicates that troubles have been almost negligible. These have been caused, first, by the grounding of direct current armatures, making the ball races of bearings paths for the current, resulting in some cases in pitting the bearing, and in other instances in the complete welding of the bearing into a solid mass; secondly, the use of improper grease, which has destroyed the bearing surface. This company feels it desirable to inclose the anti-friction bearing completely in a cartridge.

The Illinois Steel Co. at Gary has installed a number of Hyatt roller bearings, which have given splendid results. The electrical engineer at this plant thinks that it would be a good thing to equip all constant speed motors with ball bearings—especially the induction type.

The value of crude materials imported for use in manufacturing was 35 per cent greater in June this year than in June, 1921, indicating again the activity of manufacturing, for the ratio for the month of May this year compared with May, 1921, was 34 per cent. The imports of "manufactures for further use in manufacturing" were valued at 75 per cent more in June than they were in June a year ago. This shows an increase over the high ratio for May, 1922, and May, 1921, of 164 to 100.

British unemployment during the first half of 1922 averaged 16.4 per cent, as measured by trade union returns compiled by the Ministry of Labor. The figure for June, 15.7 per cent, was the best month of the six. It compares with 23.1 per cent for the previous June—the coal miners on strike at that time being excluded. The total number of workers registered as unemployed at the end of June was 1,455,000.

Serious Coal Problems Being Faced

Distribution Will Involve Many Difficulties Even if Miners' Strike Is Settled—Congress May Not Be Asked for Legislation at Present

WASHINGTON, Aug. 15.—Distribution of coal strictly in accordance with the priority rules of the Interstate Commerce Commission having been ordered by the Federal Fuel Committee, the iron and steel industry faces a critical situation unless negotiations for settlement of the coal strike in all the coal States are brought quickly to a successful conclusion. Hope is entertained here that this will come about, but even under this condition sight is not lost of the seriousness of the railroad strike situation that still exists despite efforts of the Administration to have railroad executives and shopmen come to terms. The attitude of the railroad brotherhoods has increased apprehension and left the entire matter at a point where it may have to be fought out. The announcement that the President will address Congress in a day or two does not mean necessarily that he will ask legislation, though labor evidently is attempting to bring about action from Congress that would be favorable to it as to restoration of seniority rights and other points at issue in the face of the fact that the President has suggested, with most of the railroads agreeing, that the question of seniority right be left to the Railroad Labor Board, a Government body.

If the Coal Strike Is Settled

Yet with a quick settlement of the coal strike, and the railroad situation remaining unchanged, Government officials have expressed the view that by careful distribution practically adequate supplies of coal could be furnished for all needs. While the priority classification of the iron and steel industry probably would remain as at present, with perhaps a higher rating as to certain products, such as tin plate, oil country goods, steel for car repairing and building, etc., it is thought it could be supplied sufficiently to insure good operations and permit resumption of idle furnaces and steel plants. The shortage of fuel, however, has become so acute that supervision of distribution for several months seems to be a foregone conclusion, no matter how soon the strike may be settled, either in whole or in part. While there is a belief among some that it will require a considerable time to re-equip some coal mines before they could resume normal production, the general opinion is that virtually all of them have been kept in good condition and could begin full production practically at once. This latter view is shared by Fuel Distributer Spencer, among others.

Shipments to Great Lakes

The first application of the priority rules on a large scale was made yesterday when it was decided to ship 12,000,000 tons of bituminous coal by the great lakes to the Northwest. The tonnage for the Northwest is to be shipped before the close of the navigation season, 250,000 tons to move this week, 400,000 tons next week and the remainder at the rate of 1,000,000 tons each week. The latter depends largely, however, on the assumption that union fields in Pennsylvania will be reopened soon, but is complicated by the possibility of Pennsylvania State authorities making claim for some of the tonnage for that State. The shipment of such large tonnage to the Northwest will mean the taking of coal from districts which supply large quantities to the iron and steel plants. The estimate made is said to be conservative, however, and was arrived at by a delegation comprising members of the Northwestern Coal Dock Operators' Association and members of the Minnesota State Fuel Committee who presented the fuel requirements of five Northwestern States to Mr. Spencer last week. Distribution of lake cargo coal is in charge of C. E. Tuttle. Victor Palmer, of the Rice Coal Co., Cleveland, has been appointed as adviser to Mr. Tuttle.

Mr. Spencer said yesterday that it has been definitely decided to give coal to by-product coke ovens which serve public utilities with the provision that the coke may be taken over for distribution for domestic consumption. While there are comparatively few by-product plants serving public utilities, it is plain that even these, when connected with steel works, might be unable to keep their coke.

A great deal of the time of Mr. Spencer has been taken up in conference with users of coal whose necessities were declared to be such as to make it impossible for them to go through the routine of application to governors' committees and in conference with representatives of such committees. Orders for distribution of coal have been issued as the result of representations made by some of the conferees speaking for municipalities, etc. The Dominion of Canada has become a party to the arrangement for controlled distribution of coal following the conference of Canadian representatives who informed Mr. Spencer that Canada would co-operate to the extent of its ability and would undertake to distribute coal allotted to it. Mr. Spencer said that Canada is shipping some coal to the United States.

Needs of Public Utilities

Estimates have been made by the Geological Survey that public utilities east of the Mississippi River would require 765,000 tons of coal weekly and that railroads in that section would require 2,000,000 tons each week. At the rate of production of about 3,800,000 tons weekly east of the Mississippi River, there would be left a little more than 1,000,000 tons a week for distribution among food and feed producers, handlers of perishable goods, live stock, ice plants, and coke and fuel oil plants. The production is but 38 per cent of normal and it is recognized that the output must increase greatly if the plan of distribution is to be worked out satisfactorily and production of industrial plants, including iron and steel, is to be increased rather than further curtailed.

Users of Coal Object

Users of coal in various parts of the country have already shown strong inclination to deny the authority of the Presidential Distribution Committee to take contract coal from them and divert it to other consumers, but there has been no denial of the power of the Interstate Commerce Commission to prescribe priority and preference for the supplying and moving of cars loaded with coal where there might be a conflict with coal contracted for by so-called essential users. At the same time, doubt has been expressed by some as to the right of the commission to say that where there was no transportation disability, a mine operator should decline to furnish coal on a contract say to an automobile plant unless the operator had supplied coal to a food plant with which he had no contractural relations and would not have except through a committee appointed by a governor. A conflict also has risen between preferred users. Attorney General Daugherty has rendered a decision that coal orders under priority class 1 have preference over coal produced on contract made before the issuance of service order No. 23 between a mine operator and a public utility which is also a preferred user. These questions involve the duty of the mine operator as to the order in which he shall load coal in cars set by the railroads in accordance with the Interstate Commerce Commission's orders. The

Presidential Committee has stated in an announcement that "while it is desired to preserve the integrity of contracts as far as possible, the feeling is that general contracts must, in a measure, take secondary position to the meeting of particularly urgent coal necessities created under an exigency which has arisen since such contracts were entered into.

"Present plans of the Fuel Distribution Committee are that orders for class No. 1 coal shall be so distributed as not to disturb seriously the proper distribution of cars. All orders for coal considered to be within that classification will go to the district committees, which will apportion the orders among the mines in their districts."

Ford Railroad Hauls Coal to Detroit

DETROIT, Aug. 12.—Priority rules, which the Federal Fuel Administration at Washington has undertaken to enforce, make no provision for the continuance of operations of the automotive and allied industries, according to a statement issued today by William W. Potter, Michigan fuel administrator, upon his return from a conference at Washington with Federal Administrator H. B. Spencer. The statement occasioned considerable uneasiness here, as the bulk of Michigan's industrial employment is dependent upon the operations of the motor car and accessory factories. The question now being asked is how long will the motor industry be able to continue under available power resources?

The Detroit Edison Co. this week carried one of the heaviest power loads in the history of the company, indicating that most of the factories of the metropolitan area of Detroit are using Edison power to conserve their own fuel. The Edison company has 20 days' supply of fuel on hand not subject to priority rules and which will allow the company to give capacity service over that period.

Should motor car factories be forced to suspend operations, it is not likely that such action would be necessary much before Sept. 15 or Oct. 1 and this would not be a serious matter, except for the unemployment of workers, as the early fall months are among the months of the slack production season in the industry.

An arrangement has been consummated by the Detroit, Toledo & Ironton Railroad—Henry Ford's line—and the Chesapeake & Ohio whereby a large portion of the 600,000 tons of coal accumulated on the C. & O. tracks is being released for delivery to Michigan subject to priority rules of distribution. The coal will be handled by the D. T. & I. at the rate of 200 cars a day, as the Ford road minimum wage of $6 a day has kept all its workers on the job and it is not affected by the strike. The shipments will be distributed to public utilities, food and ice manufacturers of the State and a certain percentage designated for transfer at lake ports for reshipment by boat to other States.

With the Edison company taking care of its present power requirements, manufacturers in the Detroit area are immediately concerned with the problem of obtaining sufficient cars in which to move in raw materials and send out finished products. The car scarcity is becoming more acute each day owing to the constantly accumulating number of bad-order cars.

There is little indication, thus far, of a letting down of employment. John L. Lovett, manager of the Michigan Manufacturers' Association, says that there are approximately 7500 men out of work among the factories of the State and that 5000 of them are in Detroit as a result of curtailed operations. This he attributes to inability of manufacturers to obtain shipping facilities.

Chester M. Culver, manager of the Employers' Association of Detroit, reported, this week, 181,733 men employed by the 79 firms in the association. This is a decrease of 686 men compared with the previous week. He declares this slight loss is due to refinement of production methods rather than to the fuel or rail strike effects.

Secretary of Commerce Herbert Hoover informed Detroit newspaper representatives in Washington that Ford's railroad would not be permitted to haul any more coal to Michigan than the State is entitled to in spite of the fact that the D. T. & I. is unaffected by the strike. He declared that the D. T. & I. must work collaterally with the other railroads of the country under the supervision of the Government, for the good of all.

Approximately 250 cars of fuel are reaching Detroit daily from the Kentucky fields. The average requirements are about 500 cars a day, exclusive of railroad fuel.

Improvement in Conditions

WASHINGTON, Aug. 15.—Gradual improvement in traffic conditions on railroads serving non-union fields, together with slightly greater output in fields heretofore slowed down by the strike, resulted in an increase of 500,000 tons of soft coal during the nineteenth week of the strike (Aug. 7-12) when production, according to returns so far received by the Geological Survey, was estimated at 4,800,000 net tons. Even with this increase, production is still about 550,000 tons below the level reached before the shopmen's strike. There have been only very small gains in a few of the more strongly organized districts and the increase in shipments reported has come from those districts in which production was curtailed by traffic congestion during July. Mine reports confirm evidence of railroad shipments that the response to the invitation to reopen mines has been practically confined to the non-union districts of Pennsylvania and to the more weakly organized districts of West Virginia.

The growing scarcity of coal was reflected in a decrease in the output of by-product coke in the month of July. The total production for the month was 2,486,000 net tons, against 2,580,000 tons in June. The daily average production declined from 94,000 tons in June to 80,182 tons—a decrease of 7 per cent. The ovens were operated on the average at 67.7 per cent of capacity. Of the 71 plants, 58 were active and 13 idle.

In spite of the decrease as compared with June, the July rate of output was within 3 per cent of the average for 1920, the year of maximum output. The by-product plants of the country continue to be called upon to make good the deficit of beehive coke caused by the strike in the Connellsville region and elsewhere. The beehive ovens produced only 450,000 tons in June. The total output of all coke was thus 2,936,000 tons or 68 per cent of the 1920 average.

More Suspensions at Youngstown

YOUNGSTOWN, Aug. 15.—In the Youngstown district, the steel industry is marking time, pending termination of the coal miners' and railway shopmen's strike. In some quarters there is inclination to feel that the industry will show early recovery upon adjustment of the labor difficulties. In view of depleted coal supplies, affecting all grades, producers are resorting to fuel oil and natural gas wherever possible. The Republic Iron & Steel Co. has begun the use of crude oil as a fuel in its open-hearth furnaces, several units being fired exclusively with oil. The Youngstown Sheet & Tube Co. has resorted to this substitute with satisfactory results. Open-hearth furnaces of the Brier Hill Steel Co. are equipped for using natural gas, which is proving a very acceptable substitute.

Inability to maintain coke supply has obliged the Sharon Steel Hoop Co. to bank its blast furnace at Lowellville, Ohio. For some time the company has been endeavoring, without success, to cover on additional coke requirements, necessary to keep its furnace active. This suspension reduces the number of active independent stacks in the Mahoning and Shenango Valleys to four, and a total of 14, including Carnegie Steel Co.

furnaces, out of 47 in both valleys. No. 2 blast furnace at the Farrell, Pa., works of the Carnegie company has been ordered on the inactive list, which will again reduce the number of furnaces pouring by one.

Other suspensions include the Lower Union mills of the Carnegie company at Youngstown and the rod mill of the American Steel & Wire Co. at Farrell. All of the 88 puddle furnaces at the Girard plant of the A. M. Byers Co., Pittsburgh, are cold. The skelp mill at this property was scheduled to operate until Wednesday, when the plant goes down until transportation and coal supply improve.

Partially offsetting these curtailments are the resumption of the Bessemer department of the Sheet & Tube Company, the 132-in. plate mill of the Brier Hill Company and the operation of four bar mills at the Brown-Bonnell works of the Republic Iron & Steel Co., which were idle the past week.

It is, therefore, evident that operations are wholly dependent upon fuel supply. Steel making by the open hearth process continues virtually without change, except that one less unit is active at the Lowellville plant of the Sharon Steel Hoop Co. Of the 66 open hearths in the Mahoning Valley, 48 are charged, of which 34 are being operated by independents.

Sheet and tin plate schedules continue with little change, 106 of 113 sheet mills being scheduled at the beginning of the week, and 13 of 17 tube mills. This number is subject to fluctuation, of course, before the week is over.

Increased Production in Connellsville Region

UNIONTOWN, Pa., Aug. 12.—Notable increase in production has marked the situation in the Connellsville bituminous district. Shipments over the southwest branch of the Monongahela railroad set new records twice this week since the strike developed on April 1. Peak was reached yesterday when shipments over this branch were 441 cars of coal and 180 cars of coke.

Production in the Connellsville region for the week ending Aug. 5 was 75,370 tons, an increase of 2760 tons over the preceding week. Total production in the region since April 1 is 1,372,130 tons. Estimated production of coke during the week ending Aug. 5 was 75,370 tons. One hundred and twenty-nine ovens were added to the active list, 111 of these being at plants of the Frick Coke Co.

Efforts of the State Administration through cooperation with the Hoover commission to fix prices of coal are being resisted strenuously on the part of operators in the region. The Fayette County operators are opposed to the fixing of prices unless at a point sufficiently high to protect them against the risks which are being taken in the operation of their plants. Some of the operators point out that riot and strike emergency insurance rates are so high as to preclude policies on large plants and that the risk of such damage to the plants must be borne by the operators.

Publication here of stories under Cleveland date line that the union leaders were planning to desert the men in this region who have affiliated with the union has drawn sharp reply from union organizers. A statement signed by John O'Leary, William Hines, John D. Fagan and William Feeney declares that the union men in this region will never be deserted and that with a settlement in union fields the full power of the union will be directed back of the men in this region. Reports from Cleveland are at variance with this view.

There is very little spot coal or coke in the region, practically all of the production being shipped on consignment. Coal prices for available spot, however, are as high as $12 a ton; coke up to $15 a ton.

Two miners shot from ambush at plants in the region during the week died from their wounds.

While the production has been showing a steady increase, it is due almost entirely to the work of men imported into the region.

The county this week was brought to face an outbreak of typhoid fever in the tent colony of miners at Palmer. Eighteen cases have been admitted to county hospitals from this colony and two from a tent colony at Adah. State department of health officials have begun an investigation of all tent colonies in the region. The epidemic is attributed to polluted streams and springs. Arrangements for pure water supply were made at Palmer. So far the epidemic has been confined to that at Palmer and the two cases from Adah.

Regional Requirements of Coal

WASHINGTON, Aug. 10.—The problem of transporting coal supplies from Kentucky and the Virginias up the Great Lakes before the suspension of navigation is being given serious attention by the Federal Fuel Committee. A tentative figure of 250,000 tons per week has been agreed upon for immediate movement, but this figure may be changed at any time as the situation may be reflected in the daily figures on coal production and movement. Members of the Michigan State fuel committee have been in conference with Fuel Distributor Spencer regarding the acute fuel situation in that State.

An estimate of 765,000 tons of bituminous coal weekly as being required to meet the immediate needs of gas and electric public utilities and domestic consumers in the territory east of the Mississippi River is made by the United States Geological Survey. Of this amount, New England would require 9.2 per cent; the non-coal-producing states of the coast region exclusive of New England, 21.6 per cent; coal-producing states of the coast region, 22.9 per cent; and Ohio, Indiana, Illinois and Michigan 46.3 per cent. Railroads in the same territory will require 2,000,000 tons weekly, making a total emergency requirement of 2,765,000 tons. Coal is now being produced in this territory at the rate of 3,800,000 tons weekly.

The railway mechanical situation on coal-carrying lines in the Virginias, which has been hampering the shipment of coal, continues to improve with the importation of mechanics from eastern and western lines. The requirements of the Chesapeake & Ohio and the Norfolk & Western systems are said to have been practically met, and mechanics are now being diverted to the Virginian Railway. Shipments of coal from southeastern Kentucky are being retarded to some extent by conditions at Corbin, Ky., where more than 300 railway mechanical employees are said to have left their employment because of threats of violence. An unusual situation prevails in the western Kentucky field, where coal production is accelerated by the existence of a 100 per cent car supply.

Increase in Car Shipments

WASHINGTON, Aug. 15.—An increase in the number of cars that are being loaded daily with coal is shown by reports issued by the railroads. On Monday, Aug. 7, these reports showed that a total of 16,021 cars were loaded with coal. This total has been exceeded on only seven days since the miners' strike started on April 1, and then only by an average of a few hundred cars.

The number of cars loaded daily with coal on American railroads since Aug. 1 follows: Aug. 1, 11,783; Aug. 2, 12,218; Aug. 3, 12,177; Aug. 4, 12,505; Aug. 5, 12,317; Aug. 7, 16,021.

In August, 1921, the average number of cars loaded daily with coal was 23,688.

Reports showed that on the Chesapeake & Ohio, Norfolk & Western and Louisville & Nashville, the three largest coal-carrying railroads, in the West Virginia and Kentucky non-union fields, 7,554 cars were loaded Monday, Aug. 7. These three roads in June averaged 7,373 cars daily, which was the heaviest month's coal loading in their history.

All the lower floor positions have long since been sold out for the 1922 exposition of chemical industries which will be held at the Grand Central Palace, New York, Sept. 11 to 16, and spaces on the third and fourth floors are at a premium. With over 400 firms already signed up, there is little doubt but that the first four floors of the Grand Central Palace will be crowded with exhibitors during chemical exposition week.

United States Pig Iron Production for First Half of 1922

The American Iron and Steel Institute in its special statistical bulletin No. 4 gives the production of all kinds of pig iron in this country for the first six months of the present year. The total is 12,191,011 tons, which compares with 9,530,981 for the first half of 1921 and 18,435,602 for the first half of 1920. For the first time, there was no production of anthracite and mixed anthracite and coke pig iron. There was no production of charcoal pig iron in the group composed of Massachusetts, Connecticut, New York and Pennsylvania. Of the total 84,786 tons of charcoal, the group composed of Michigan, Wisconsin and Missouri produced 71,333 tons.

HALF-YEARLY OUTPUT OF PIG IRON BY STATES.

HALF-YEARLY PRODUCTION OF ALL KINDS OF PIG IRON

States.	Blast furnaces *				Production—Gross tons (Includes spiegeleisen, ferro-mang., ferro-silicon, ferro-phosphorus, etc.)		
	In blast Dec. 31 1921.	June 30, 1922. In.	Out.	Total.	First half of 1921.	Second half of 1921.	First half of 1922.
Maine	0	0	0	0			
Massachusetts	0	0	1	1	1,537	605	.. ..
Connecticut	0	0	2	2			
New York	10	13	14	27	506,113	462,547	833,488
New Jersey	1	1	3	4			
Pennsylvania	46	69	92	161	3,577,570	2,675,196	4,339,560
Maryland	1	4	3	7	75,130	72,059	140,885
Virginia	0	0	17	17	53,519	13,720	
Alabama	13	22	21	43	659,225	548,183	963,019
Georgia	0	0	3	3			
Texas	0	0	1	1			
West Virginia	2	2	3	5	117,215	147,544	240,822
Kentucky	1	2	5	7			
Mississippi	0	0	1	1			
Tennessee	1	2	15	17	12,369	7,110	17,585
Ohio	26	41	39	80	2,081,847	1,717,766	2,898,846
Illinois	9	16	10	26	1,030,801	581,232	1,237,877
Indiana	9	12	4	16	1,019,010	874,601	1,252,733
Michigan	4	9	4	13			
Wisconsin	1	3	4	7	211,574	15,289	102,809
Minnesota	0	2	1	3			
Missouri	0	0	3	3			
Iowa	0	0	0	0			
Colorado	1	3	2	5	185,071	41,293	163,387
Oregon	0	0	1	1			
Washington	0	0	0	0			
Total	125	201	249	450	9,530,981	7,157,145	12,191,011

*Completed and rebuilding.

HALF-YEARLY PRODUCTION OF COKE PIG IRON.*

Maine	0	0	0	0			
New York	10	13	13	26	507,108	463,152	833,488
New Jersey	1	1	3	4			
Pennsylvania	46	69	81	150	3,564,405	2,674,267	4,339,560
Maryland	1	4	2	6	75,130	72,059	
Virginia	0	0	17	17			140,885
Georgia	0	0	2	2	53,519	13,720	
Texas	0	0	1	1			
Alabama	11	20	20	40	655,693	539,074	949,566
West Virginia	2	2	3	5	117,215	147,544	240,822
Kentucky	1	2	5	7			
Tennessee	1	2	12	14	12,369	7,110	17,585
Ohio	26	41	39	80	2,081,847	1,717,766	2,898,846
Illinois	9	16	10	26	1,030,801	581,232	1,237,877
Indiana	9	12	4	16	1,060,523	874,860	1,256,880
Michigan	2	2	2	4			
Wisconsin	1	2	4	6			
Minnesota	0	2	1	3			
Missouri	0	0	2	2			
Iowa	0	0	0	0	289,612	40,646	190,716
Colorado	1	3	2	5			
Washington	0	0	0	0			
Oregon	0	0	1	1			
Total	121	191	224	415	9,448,223	7,131,430	12,106,225

*Includes ferro-alloys made with electricity, electricity and coke, etc.

HALF-YEARLY PRODUCTION OF ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

Pennsylvania	0	0	7	7	12,823	920	.....
Total	0	0	7	7	12,823	920	.....

HALF-YEARLY PRODUCTION OF CHARCOAL PIG IRON.

Massachusetts	0	0	1	1			
Connecticut	0	0	2	2			
New York	0	0	1	1	883	9	.....
Pennsylvania	0	0	4	4			
Maryland	0	0	1	1			
Alabama	2	2	1	3			
Georgia	0	0	1	1	3,532	9,109	13,453
Tennessee	0	0	3	3			
Mississippi	0	0	1	1			
Michigan	2	7	2	9	47,346	15,030	
Wisconsin	0	1	0	1	24,174	647	71,333
Missouri	0	0	1	1			
Total	4	10	18	28	69,935	24,795	84,786

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Coke*	121	191	224	415	9,448,223	7,131,430	12,106,225
Anthracite†	0	0	7	7	12,823	920	.....
Charcoal	4	10	18	28	69,935	24,795	84,786
Total	125	201	249	450	9,530,981	7,157,145	12,191,011

* Includes ferro-alloys made with electricity, electricity and coke, etc.
† Includes mixed anthracite and coke pig iron.

HALF-YEARLY OUTPUT OF PIG IRON BY GRADES.

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States.	First half of 1921.	Second half of 1921	First half of 1922.
New York, New Jersey	199,568	189,342	428,536
Pennsylvania—Allegheny County	1,024,302	663,421	1,248,060
Other counties	736,305	605,273	1,100,324
West Virginia, Alabama, Kentucky	438,730	381,637	641,200
Ohio	685,788	540,009	1,257,315
Indiana, Illinois	1,149,432	824,744	1,534,969
Michigan, Minnesota, Missouri, Colo.	270,306	44,214	179,472
Total	4,504,431	3,248,640	6,389,876

HALF-YEARLY PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York	61,225	22,201	50,541
Pennsylvania	1,381,591	1,084,752	1,516,802
Maryland	74,660	46,839	193,115
West Virginia, Tennessee, Alabama	73,816	23,782	
Ohio	1,081,868	794,007	1,199,416
Indiana, Illinois, Iowa, Colorado	606,912	343,562	552,730
Total	3,280,072	2,315,143	*3,512,604

*Includes 60,372 ton of low-phosphorus pig iron.

HALF-YEARLY PRODUCTION OF FOUNDRY PIG IRON AND FERRO-SILICON.

Maine, Massachusetts	1,537	605	.....
New York, New Jersey	215,512	192,376	308,129
Pennsylvania	285,798	270,315	395,792
Maryland, Va., West Va., Ky., Tenn.	67,138	45,850	36,853
Alabama	241,091	279,007	459,563
Ohio	219,004	189,782	219,069
Indiana, Illinois	104,944	103,464	82,192
Michigan	148,110	100,301	130,763
Wisconsin, Missouri, Iowa, Colorado	122,265	11,037	86,868
Total	1,375,399	1,192,737	*1,629,229

*Includes 41,913 tons of ferro-silicon.

HALF-YEARLY PRODUCTION OF MALLEABLE PIG IRON.

New York	22,533	49,279	35,348
Pennsylvania	14,099	6,644	17,945
Ohio	62,267	155,843	195,036
Indiana, Illinois, Mich., Wis., Minn.	66,623	80,052	179,669
Total	165,522	291,818	427,998

HALF-YEARLY PRODUCTION OF FORGE PIG IRON.

New Jersey, Pennsylvania	13,280	23,832	65,845
Alabama	5,276	4,162	10,181
Ohio	30,381	35,817	26,858
Total	48,937	63,811	102,884

HALF-YEARLY PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania, Maryland, Ala., Tenn.	131,739	23,871	96,555
Illinois, Washington	4,530	38	.....
Total	136,269	23,909	*96,555

*Includes 69,482 tons of ferro-manganese and 27,073 tons of spiegeleisen.

HALF-YEARLY PRODUCTION OF OTHER GRADES.

New York, New Jersey	4,482	4,771	4,269
Pennsylvania	2,895	1,666	1,443
Maryland, Va., West Va., Tenn., Ala.	7,101	7,339	14,858
Ohio	2,539	2,308	1,152
Indiana, Illinois, Michigan, Wisconsin, Missouri, Colorado	3,334	5,003	10,143
Total	20,351	21,087	31,865

PIG IRON MADE FOR SALE OR FOR USE OF MAKERS IN THE FIRST HALF OF 1922.

Grades.	For sale.	For maker's use.	Total Gross tons.
Basic	620,654	5,769,222	6,389,876
Bessemer and low-phosphorus	203,091	3,309,513	3,512,604
Foundry, including ferro-silicon	1,577,144	52,085	1,629,229
Malleable	318,723	109,275	427,998
Forge or mill	29,497	73,387	102,884
Ferro-manganese	30,829	38,653	69,482
Spiegeleisen	16,558	10,515	27,073
All other grades	16,246	15,619	31,865
Total	2,812,742	9,378,269	12,191,011

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ESTABLISHED 1855

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Paying Toll to Railroad Workers

We have pointed out before, but the fact cannot be too much emphasized, in getting at the real inwardness of the present struggle between the public and the railroad unions, that the railroad workers insist on having an excessive share of the total return to the country's labor. Deflation, in the unions' view, may be well enough for farmers, steel workers, textile employees, and scores of other battalions in the great industrial army, but all that railroad labor was able to wrest in war time from the Government management of the railroad lines it proposes to keep.

The ordinary man among the 104 millions or more Americans apart from railroad workers and their families has found out in a score of ways how the demand of the railroad unions for the continuance of war-time wages, when wages in nearly all other employments have come down well below war-time levels, is affecting his own buying power.

High transportation cost is high railroad labor cost, and high transportation cost is entering into the price of everything the average citizen eats or wears, of the fuel he buys and of the house in which he lives.

The *Bache Review*, pointing out that the farmer did not respond to the labor leaders' plea, soon after the war, to join in the movement for political control by organized labor, cites the analysis of the situation recently made by President David Friday of the Michigan Agricultural College. He estimates that in 1921 railroad employees, who make up less than 4½ per cent of our total working population, received as wages nearly 7 per cent of the nation's purchasing power—that is, of the nation's total agricultural, mining and manufacturing product. The farmers, who make up more than 26 per cent of the total working population, received less than 20 per cent of the total national income. In other words, there were six times as many workers in agriculture as in railroad transportation, and yet they received only three times as much of the year's production as did the railroad workers. That means, in short, that the average return from railroad employment is twice as great as the average return from the pursuit of agriculture.

It is not to be expected, under such a distribution of the rewards of labor in the two employments, that the farming community will aline itself with the aims of the organized workers on the railroads. On such a basis, the farmers, in common with other large sections of the community, are working for the railroad unions, just as the vast majority of the 40 millions or more of our population engaged in gainful occupations have long been working also for the members of the building trades unions and the United Mine Workers of America.

Public Concern in Coal

The chief basis upon which the Government undertook to assert authority over railroad rates and practices, more than a third of a century ago, was that the railroads had been given the right of eminent domain. The fact that they performed a "public service" lay far in the background, but it has since come to the front. The view of what constitutes a "public service" has gradually expanded, for several reasons. One is that with improvements in methods of communication services become more public and less localized. Another is that the public realizes more and more that when society furnishes protection to an industry it is entitled to consideration in return. Yet another is that labor unions have been working in the direction of nationalizing their arrangements, railroad labor being conspicuous in this connection.

With all the talk, however, of Government control of the coal industry it is apparent that the public at large has a remarkably small amount of interest in the subject. It is familiar with coal prices represented by high multiples of a dollar; but how many persons remember that often before the war, and occasionally even after the war started, coal sold at a single dollar a ton? When a contest between employer and employee in the coal industry is staged, the general public is scarcely even irritated and it is certainly not aroused. When after four months of a coal strike

a factory here and there closes for lack of coal there is a little mild surprise, perhaps a faint regret that the factory did not lay in a bigger stock of coal or that the strike had not been confined to a period of three or four months.

Those who have given any study at all to coal realize what an uneconomical alinement has been built up; but that is not the general public. The general public suffers and does not realize that it suffers. It may well be asked why it should be anybody's duty to inform the public of its suffering. Experience has shown that executive action cannot be depended on to help matters in coal. There was a little judicial action a couple of years ago, but even this has hung fire meanwhile. There remains legislative action, which should depend upon public demand, but does not always promptly follow public demand. As a matter of plain fact, really public demand has been decidedly lacking.

It has been assumed in Washington that in an emergency like the coal strike the Government has authority to seize the coal mines and operate them, but it has been assumed at the same time that in that case the Government would pay miners practically the wages they asked. It is also assumed that by legislative enactment the Government can regulate the coal industry, provided it does not attempt "confiscation," which is a term not yet defined in dollars or per cent, even as to transportation facilities.

Government regulation of coal would rest upon a very plain and substantial foundation. The great percentage of coal mines exist by grace of the rail transportation facilities, which the Government has obligated itself to take care of. The Government wishes the public to have reasonable transportation service, but does not wish it to have to pay for the creation of unnecessary facilities. If part of the coal industry operates and part is idle, the public can be served with coal only by some roads having to haul unreasonably much coal while others have but a small proportion of the traffic. Backing the railroads, the Government has a right to demand that coal mining be fairly distributed geographically and in point of time. The Government has the right, but it is not likely to exercise that right unless or until the public at large calls out to it to do so.

The growth of the electric furnace steel industry of Italy since the war has been remarkable. According to the information on other pages, which is corroborated by private advices, there are now about 180 electric steel furnaces of various types and capacities in Italy. Thus the Italian industry has a place close to the front rank and is exceeded only by that of the United States. In 1914 the two countries were credited with about 20 furnaces each, according to the first review of this industry published by THE IRON AGE. While the United States to-day has over twice as many furnaces as Italy, the latter country has probably outrun both Great Britain and Germany. In output, also, Italy ranks high, production in 1920 having been about 100,000 tons and in 1921 about 140,000 tons, the United States alone producing more. In size, also, the Italian furnaces are noteworthy, there being several of 20 to 25 tons' capacity and 23 furnaces of 15 tons' capacity. The north of Italy has been the seat of the largest recent expansion. Cheap water power and other conditions have made such rapid progress possible.

The Key Place of Chromium

The need of a metal with unusual tensile strength at high temperatures and pressures, and also with good resistance to corrosion, has long been recognized. Industrial operations making such demands are many—among others, the production of ammonia, the use of superheaters in various industries, of pipe for oil-cracking operations, of steam and gas turbines and of internal combustion engines.

That the problem is being solved appears from the development in recent months of several alloy steels having exceptional strength at high temperatures and pressures, as well as anti-corrosive or non-oxidizing properties. Two articles printed in this issue throw new light on the subject, one dealing with stainless steel and the other with some special German alloy steels. The solution of the problems mentioned has been largely due to the employment of alloy steels containing chromium or chromium combined with other metals, such as nickel.

To such an extent has chromium functioned in this connection, and in other important uses, that it is not uncommonly spoken of as the master metal in the alloy field. To its familiar uses as an essential constituent of steels with maximum strength at high temperatures has been added more recently its notable performance as the foundation of the stainless steels and irons.

No standard high-speed steels are made without chromium. During the war, when tungsten was lacking for the making of permanent magnets, chromium filled the breach. It is the basis of many important alloy steels which have figured largely in the advance of the automobile and other industries. In simple heat-resisting alloys for heat treatment and other uses it has been the key to success. Moreover, recent experiments have shown that as an ingredient in certain non-ferrous alloys it has added greatly to their strength and ductility.

Yet with all this advance, to which the electric furnace and a succession of discoveries in heat treatment have contributed so largely, there are not lacking predictions whose plain implication is that the field of heat-treated chromium alloys has scarcely been scratched.

Ferromanganese imports are gaining in volume and in June reached a figure in excess of the pre-war record. In 1913 the average was 10,600 tons per month, but in June of this year 13,500 tons was exceeded and the July figures will be larger, many contracts having been placed with British makers because of the American fuel situation and also in anticipation of a high duty. Receipts of manganese ore, including several cargoes of Russian ore, are also expanding, having

been over 45,000 tons per month for May and June, a figure in excess of the average for 1913 or 1921. Despite the increased duty on the ore, should the pending tariff bill pass, these imports must of necessity continue in large volume, since American mines do not contain the grade or the quantity adequate to supply the American steel industry.

Less Iron Ore Per Ton of Pig Iron

Consumption of iron ore per ton of pig iron made was lower in 1921 than in any previous year in the record, which extends back to 1909. It may have been the lowest in the history of iron making in the United States. The showing is important, in view of the common impression that increasing leanness of our iron ores furnishes a problem.

The highest ore consumption shown in the record was in 1911, a year of light production, and 1912, a year of heavy production. Taking the average of 1911, 1912 and 1913, as constituting the three-year period before the war, the following showing is made, the figures being per gross ton of pig iron produced:

Ore, briquettes, etc., gross tons	1.871
Scrap, scale, etc., gross ton	0.134
Total, gross tons	2.005
Limestone, pounds	1156.7
Coke, pounds	2434.9

The consumption of ferrous material is the average for all pig iron produced, as the statistics do not segregate. The limestone is for coke furnaces only (and a negligible output of anthracite furnaces), the charcoal furnaces being excluded. The coke consumption is of coke furnaces only, excluding anthracite and charcoal furnaces, and is the average of 1912 and 1913, as statistics of fuel consumption were not gathered for 1911.

Consumption of iron-bearing material in 1921, as given in the annual report of the American Iron and Steel Institute, just issued, makes a very favorable comparison with the average of about nine years previous. In 1921 the average consumption of ore, etc., was 1.784 gross tons and of scrap, etc., 0.141 ton, making a total of 1.925 tons, representing a decrease of 4 per cent.

With a decrease in the consumption of ferrous material there was of course less impurity to be slagged off, and the limestone consumption accordingly fell, the 1921 average being 995.5 lb., representing a decrease of 14 per cent from the average of the years 1911-1913.

Concurrently with these decreases, a lessened consumption of coke would be expected. The coke dropped to 2200.6 lb., representing a decrease of 9½ per cent.

These evident savings are of no small consequence. Making guesses as to what should be considered normal values in present times, of the materials delivered at the typical blast furnace, the saving in raw material is found to lie in the neighborhood of $1 per ton.

It would require a much more exhaustive analysis than is possible with the statistics available, to determine the precise ways in which the average of blast furnace practice has been improved. One thing can be observed from the statistics, that Alabama has helped to improve the general showing. That State, which is quite separate from the rest of the industry, decreased its limestone consumption from 746 lb. in 1913 to 557 lb. in 1921, per ton of pig iron made, this being well below the average of the country, and at the same time slightly increased its contribution to the total pig iron output. This, however, is a relatively insignificant item.

In general, one is led to conclude that improvements of various sorts in blast furnace practice have done much more than to offset such decrease as has occurred in the iron content of the ores that must be used. As the decades pass the industry will be driven to use leaner and leaner ores, there being immeasurable quantities low down in the scale, and it is encouraging to note that up to date the technique of the industry has more than kept pace.

CORRESPONDENCE

Developing the Will to Work

To the Editor: In THE IRON AGE of July 20 I noticed an editorial on "A Better Philosophy of Work," which was as timely as it was interesting and true. It is only too true, as you say in the closing paragraph of the editorial, that we are most unfortunate if we are unable to discover new viewpoints concerning the social value of work—if you had that in mind when speaking of the philosophy of work. We have been spending much time, money and energy on symptoms, by sentimental welfare work and paternal care of the mental, moral, physical, educational and literary needs of the worker; all of which, I have often noticed, smacks too much of the feudalism of the Middle Ages and has a tendency to create antagonism between labor and capital instead of harmony and mutual confidence.

As a matter of fact, the craft guilds of the Middle Ages had a better way of appealing to the character of the worker and developing in him that philosophy of work which you seem to have in mind than modern industry has. In saying this I speak from experience, because the medieval guild system was still in vogue when I was a young man, the last vestige of the system being officially abolished in Germany in 1865. The governments of the various German states retained that system so long for the very purpose of extending to the growing industries of Germany their social-ethical features, not the least of which was the cultivation of respect for work as a civic virtue. As a member of a medieval guild from 1854 to 1865, with all that this implied in those days, I feel justified in saying that the rapid and sound development of the German industries during the middle of the last century and later was largely due to the inherited influence of the guilds.

For 56 years now, or since 1866 when I came to this country, I have been in intimate contact with the development of American industry, particularly during the more than 30 years of my connection with the Pennsylvania Railroad Testing Laboratory, and during the trying and critical transitory period from iron to steel. And I am compelled to say that American industries, particularly corporations and industrial combinations, have succeeded admirably in repressing those characteristics of human nature which would favor the cultivation of a philosophy of work such as you refer to in the editorial mentioned. Does not the present attitude of labor indicate a serious dislocation of social relations between capital and labor, between employer and employee? True, there are strikes in European countries, but, with the exceptions of the communists'

demands, the mass action of labor there has not the sinister aspect it has with us.

It has often occurred to me that our technical journals have devoted themselves so exclusively to matters of the technique of machinery and processes and the mechanism of industrial organizations that they have lost sight of the interdependence and interrelations of the industrial fabric with the social structure. Industrial management needs a revival along social, not socialistic, lines as much as the worker. Technical progress has been so rapid and so destructive of the older social relations in society that the slower moving social evolution has been unable to keep up with the new requirements. Mass production and quantity requirements have overshadowed the ethical demand for social self-preservation. How long can we go on that way without even more serious disturbance of industrial, social and economic relations?

PAUL KREUZPOINTNER.

Altoona, Pa., Aug. 12.

JAPANESE MARKET QUIET

Competition from India in Pig Iron—Steel Market Weak—Copper Fairly Firm

TOKIO, JAPAN, July 10.—In the Japanese steel market quietness rules, but there are noticeable signs of improvement. Prices have ceased to fall away substantially. Unexpected business in the cocoon trade for several weeks is assisting credit in the provinces and inquiry for materials from provincial builders is on the increase. Efforts to stabilize the market on the part of importers and leading holders of stocks are having their effect. Prices, which have been weak, now stand unchanged. Round bars are quoted at 4.60 yen per 10 kwan (2.68c. per lb.), flats and squares at 4.90 yen (2.83c. per lb.) and plates at 7 yen (4.05c. per lb.). Tin plates are in an unfavorable position, packers who were expected to buy heavily showing no inclination to come into the market.

Company Has Orders Until 1924

That sufficient orders are on hand to keep the plant in full operation until 1924, with the full force of 20,000 workmen, and that an annual dividend of 15 per cent will be paid was definitely announced in a recent address by the president of the Kawasaki Dock Co. of Kobe at the semi-annual meeting of the shareholders. Orders have been received by the company for the building of five submarines, one light cruiser and two naval special service boats, all, it is stated, within the bounds of the Washington Conference limits. In addition, the company has received orders for 112 locomotives, 200 passenger cars and 252 freight cars. The chairman added: "Since our company holds several foreign electric patents we shall soon begin turning out electric machinery and apparatus for the electric industry of this country, which is still in an undeveloped condition."

Tenders for electrolytic copper are to be received at the Tokio Arsenal, and in anticipation the market has tended upward for the past few days, the quotation standing at 45.60 yen and 45.70 yen per 100 kin. (16½c. per lb.). The tone of the Osaka market is also fairly firm. Of late the price of electrolytic copper differs about one yen between the Tokio and Osaka markets. When tenders were last called, the Tokio Arsenal stipulated quality of 99.96 per cent pure, taking the Japanese electrolytic copper as a standard, but in the coming tender the Arsenal has altered the stipulation of quality to the American electrolytic copper as standard, and, therefore, it is supposed that some importers of American copper in Japan will participate.

Steady Importation of Indian Pig Iron

The pig iron market is dull. The price is prevented from decline only by the limited quantity of stocks. In the Tokio market some consumers are in financial difficulties. No. 1 Kamiasha is quoted nominally at 70 yen ($33.50) per ton, No. 1 Wanishi at 67 yen ($32.05) per ton, and No. 1 Rayang at 65 yen ($31.10). Indian iron is offered at still lower prices, and forms a menace to the market, arriving at the rate of 5000 to 7000 tons per month. Tata iron is quoted at 61 yen ($29.20) per ton, and Bengal at 60 yen ($28.72) per ton. The importation of pig iron into Japan from Europe and the United States is now practically impossible. American iron is out of stock in Tokio, while Cleveland (England) is quoted at 78 to 80 yen ($37.34 to $38.30) per ton.

German Trade with Japan Increasing

Indications of Germany's rapid recovery from the war may be seen in her trade relations with Japan. Imports by Japan from that country have been so heavy lately that Japanese manufacturers are complaining and seeking protection. German products, they state, are selling at prices lower than the Japanese market, especially in steel, machinery and dyes. German steel exports to Japan are showing up well, while America's exportation is on the decline, and Great Britain's record is slightly better than in the previous year.

Workmen's Compensation Laws from the Physician's Viewpoint

The relation of the physician and his industrial work to workmen's compensation laws is among the subjects considered in the report recently issued by the National Industrial Conference Board, 10 East Thirty-ninth Street, New York, for the Conference Board of Physicians in Industry, which acts as advisor on industrial medical problems to the former organization.

It is pointed out that although the effective administration of workmen's compensation laws depends in large measure upon the work of medical men, Washington is the only State to give a physician membership in its industrial commission by legal enactment. In that State the medical member is chairman of the board.

Compensation for hernia is discussed in the report by Dr. S. M. McCurdy, Youngstown Sheet & Tube Co., who expresses the opinion that hernia is seldom due to occupational causes, but is produced by the aggravation of a condition present in the majority of persons from birth. He states that hernia should be considered as an occupational disease rather than as an industrial accident and cured by surgical treatment. It is emphasized that a worker with hernia should not be denied employment but, after examination, should be placed at work for which he is suited, and his work supervised by the plant physician.

That each compensation commission has its own method of estimating eye injuries and no two of these methods are similar, resulting in conflicting standards among the states is pointed out by Dr. J. A. Jackson, New York Edison Co. This often has the effect of leaving employer and employee in doubt as to whether they have received proper recognition for their claims. A standard method of testing eyes is advocated.

Back injuries from the compensation standpoint, and the difficulty of determining not only the cause, but the exact type of the injury, is taken up by Dr. F. E. Schubmehl, General Electric Co.

That the introduction of the physician into the industrial organization has produced many beneficial results is the conclusion reached in the report, it being pointed out that the physician's work has revealed to the employer many sources of economic waste and to the worker the unnecessary price he is paying for inattention to his health.

A 20-ton open-hearth furnace is to be erected by the S. R. Smythe Co., Oliver Building, Pittsburgh, for the Universal Steel Co., Bridgeville, Pa., on foundations built by Universal company. The furnace is of the Smythe design with no unusual features.

NEW PERSONNEL ASSOCIATION

Engineers and Managers Organize to Study Industrial and Labor Questions

To study the human factor in American business and industrial life, to solve the problems which confront the management of industrial enterprises, and to bring about a better understanding of the labor question, leaders of organized engineering, representatives of large industries, insurance companies, railroads and publishers, and members of university faculties have organized the National Personnel Association.

The new organization takes over the activities of the National Association of Corporation Training and the Industrial Relations Association of America. Cooperative research will be conducted on a nationwide scale, and close relations will be established with colleges and universities in carrying out an extensive educational program.

An executive committee and a board of directors have been chosen. Members of the committee include Sam A. Lewisohn, Miami Copper Co., New York; John McLeod, Carnegie Steel Co., Pittsburgh; J. M. Larkin, Bethlehem Steel Co., Bethlehem; W. H. Winans, Union Carbide & Carbon Corporation, New York; J. W. Dietz, Western Electric Co., New York; Francis Farwell, Worthington Pump & Machinery Corporation, New York; S. R. Rectanus, American Rolling Mill Co., Middletown, Ohio, and Arthur H. Young, International Harvester Co., Chicago.

L. W. Wallace, executive secretary of the Federated American Engineering Societies, and L. P. Alford, New York, vice-president of the American Society of Mechanical Engineers, are among the directors elected. Among the several other directors are Alvin E. Dodd, United States Chamber of Commerce, Washington; C. V. Derrick, American Bosch Magneto Co., Springfield, Mass.; F. H. Dodge, Burroughs Adding Machine Co., Detroit; Dr. E. M. Hopkins, Dartmouth College, Hanover, N. H.; A. H. Lichty, Colorado Fuel & Iron Co., Denver; E. S. McClelland, Westinghouse Electric & Mfg. Co., East Pittsburgh; Louis L. Park, American Locomotive Co., Schenectady; F. W. Thomas, Atchison, Topeka & Santa Fe Railroad, Topeka.

W. W. Kincaid, Niagara Falls, head of the Spirella Co., has been named president of the new organization. Earl B. Morgan, Curtis Publishing Co., Philadelphia, is vice-president, and Montague A. Clark, the E. I. DuPont de Nemours & Co., Arlington, N. J., is treasurer. W. J. Ronald, 20 Vesey Street, New York, is the managing director and secretary. C. S. Coler, educational director, Westinghouse Electric & Mfg. Co., has been appointed chairman of the committee on industrial and public school relations.

To Help Associations Conduct Statistical Bureaus

WASHINGTON, Aug. 12.—A wider collection and use of essential business statistics is urged on business organizations by the fabricated production department of the Chamber of Commerce of the United States. It is preparing to set up a service for chambers of commerce and trade associations for the purpose of informing them how statistical bureaus may be established and operated.

New England Foundrymen Outing

The New England Foundrymen's Association held its annual August outing Wednesday, Aug. 9, at The Hummocks, Hamilton, R. I. It was the largest attended and most successful outing of its kind ever held. Approximately 170 enjoyed the clambake. Providence members of the association had charge of the affair. Edward F. Parks, Universal Winding Co., was chairman of the committee of arrangements; A. J. Miller, Whitehead Brothers Co. and C. H. Colvin, Colvin Foundry Co., were in charge of indoor and outdoor sports and entertainment; and W. Scott Thomas, J. W. Paxson Co., of transportation. These gentlemen and the following constituted the general committee: W. G. Rich, Providence Gas Co.; J. W. Richardson, H. & B. American Machine Co.; William S. White, J. S. White Co.; Henry S. Chafee, Builders' Iron Foundry; Harry C. Johnson, General Fire Extinguisher Co.; R. C. Fuller, Fuller Iron Works; W. M. Saunders, Saunders & Franklin; C. D. Starr, Barstow Stove Co.; George R. Burt, Franklin Machine Co.; John E. Aldrich, New England Butt Co.; L. M. Sherwin, Brown & Sharpe Mfg. Co.; and Charles E. Andrews, Whitehead Brothers Co. No association business was transacted at the outing.

Farm Implement Makers to Meet

The National Association of Farm Equipment Manufacturers, formerly known as the National Implement and Vehicle Association, will hold its annual convention at the Congress Hotel, Chicago, on Oct. 18, 19 and 20. Arrangements for the program have not been completed, but tentative acceptances have been received from at least one cabinet member, from the president of one of the best known railroads, from a prominent authority on agriculture and from a leader in agricultural finance. In addition to speakers from outside the association, the following are among the subjects which will be discussed by members: "Present and Future of the Implement Industry," "Transportation Situation from the Shippers' Viewpoint," "The National Institute of Progressive Farming," "Depreciation."

Trade Association Executives to Meet

The American Trade Association Executives will hold its third annual meeting at the Inn, Buck Falls, Pa., which is near the Delaware Water Gap, Oct. 25, 26 and 27. In view of the considerable talk there has been about trade associations, this meeting is expected to be of a particular interest to those in trade association work. The railroad station is at Cresco, on the Delaware, Lackawanna & Western Railroad.

The Commercial Steel Sales Co. has been organized in Philadelphia and has taken offices in the Stock Exchange Building, that city. It will represent in a sales capacity several companies making finished and semi-finished iron and steel. S. J. Carroll, formerly vice-president of the Pennsylvania Steel Export Co.; H. S. Gilhams, formerly of H. S. Gilhams Co., and J. S. Kenyon, formerly general manager of the Duplex Metallic Co., all of Philadelphia, are the officers and directors of the new organization.

COMING MEETINGS

August

Lake Superior Mining Institute. Aug. 28 to 30, inclusive. Annual meeting, Houghton, Mich. Secretary, A. J. Yungbluth, Ishpeming, Mich.

National Safety Council. Aug. 28 to Sept. 1. Annual meeting, Cass Technical High School, Detroit. Secretary, W. H. Cameron, 166 North Michigan Avenue, Chicago.

September

American Engineering Council. Sept. 8 and 9. Executive board meeting, Boston. Report on three-shift day in industry. Secretary, L. W. Wallace, 719 Fifteenth Street, N. W., Washington.

Association of Iron and Steel Electrical Engineers. Sept. 11 to 15, inclusive. Annual convention, New Auditorium, Cleveland. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

National Exhibition of Chemical Industries. Sept. 11 to 16. Grand Central Palace, New York.

American Electrochemical Society. Sept. 21, 22 and 23. Fall meeting, Windsor Hotel, Montreal, Canada. Secretary, Dr. Colin G. Fink, Columbia University, New York.

American Institute of Mining and Metallurgical Engineers. Sept. 25 to 29. Pacific Coast meeting, Engineers' Club, San Francisco. Secretary, F. F. Sharpless, 29 West Thirty-ninth Street, New York.

STRICT PRICE CONTROL

Secretary Hoover Favors Legislation—Position of the President Not Known

WASHINGTON, Aug. 15.—Congress will be asked within a short time to enact legislation providing for the strict control of prices and distribution of coal and probably within 48 hours will be addressed by President Harding regarding the railroad situation.

These were the two outstanding features of the coal and railroad strikes which developed in Washington to-day. It is evident that the administration realizes that a critical condition is faced by the country and that it must be met at once if much more serious crippling of transportation and industry and suffering of the public are to be avoided. The railroad situation is declared to be growing worse and efforts to solve it by negotiations are deadlocked. It is the purpose of the President to present the complete railroad situation to Congress and the country, but as yet it is not known by him what suggestions he may make.

Secretary Hoover's Position

While the President is represented as believing the coal problem is not far from a solution, it was stated this morning by Secretary Hoover that regardless of how soon extensive coal mining operations are resumed, it will be necessary to get prompt legislation enacted for strict control of prices and distribution of coal. This is especially necessary, he pointed out, as it relates to lake cargo and anthracite coal, but the plan which is proposed, it is taken for granted, will apply to all coal for industrial and other uses.

It was stated that continued control of prices and distribution of coal now under a more or less stringent voluntary system cannot prevail indefinitely and it has been taken as a foregone conclusion that coal distribution under Government supervision will be necessary for a period, no matter how soon the strike comes to an end. The point has been made that although the Interstate Commerce Commission can allot cars and establish priority; it has nothing to do with actual distribution and prices as such, but deals only with transportation. The statement was made that while some non-union operators are adhering to their agreement with Secretary Hoover as to prices, others have been and are breaking away from it and asking much higher levels. It is assumed that if Congress provides the legislation, the authority given by it will be exercised through the President's Fuel Administration Committee.

Inconsistent With Priorities Plan

The Interstate Commerce Commission to-day issued a statement pointing out that application of the so-called "railroad assigned car rule" is inconsistent with the plan of priorities carried in car service order No. 23 and ordered that it should not be invoked by the railroad carriers subject to the priority rule. The effect of this is to require carriers to get coal through the Federal Fuel Distibution Committee rather than to resort to the customary plan of assigning cars to mines and taking coal under the "assigned cars rule."

FABRICATED STEEL BUSINESS

Bridge and Building Awards and Tonnages Pending at Leading Centers

Awards for fabricated steel work for the past week include the following:

Building at Perth Amboy, N. J., 250 tons, to Schrimpf Iron Works.

St. Paul Street bridge, Baltimore, 400 tons, to Chesapeake Iron Works.

Hunters' Point telephone exchange for New York Telephone Co., 1000 tons, to Eidlitz & Ross.

Garage on East Seventy-sixth Street, New York, 900 tons, to George A. Just Co.

Public School No. 139, New York, 800 tons, to A. E. Norton, Inc.

New armory, New York, 1300 tons, Post & McCord, low bidder.

Masonic Temple, Paterson, N. J., 500 tons, to Paterson Bridge Co.

Yarn building, Newburgh, N. Y., 100 tons, to American Bridge Co.

Apartment building, 2450 Lake View Avenue, Chicago, 688 tons, to American Bridge Co.

Standard Oil Co., 46 additional oil tanks of 80,000-bbl. capacity, Casper, Wyo., 14,000 tons, 29 tanks to Chicago Bridge & Iron Works and 17 to American Bridge Co.

Five additional stories Carter Building, Houston, Tex., 306 tons, to Houston Structural Steel Co.

High school building, Rock Rapids, Iowa, 109 tons, to unnamed fabricator.

Nevada Consolidated Copper Co., building, Salt Lake City, Utah, 2000 tons, to Kansas City Structural Steel Co.

Additional steel for Kansas City Athletic Club building, Kansas City, Mo., 200 tons, to Kansas City Structural Steel Co.

Addition to plant of Lima Locomotive Works, Lima, Ohio, 1700 tons, to Massillon Bridge Co.

Witherbee, Sherman & Co., Port Henry, N. Y., 500 tons, to the Lackawanna Bridge Works Corporation.

Addition for power plant for L. E. Myers Co., Tony, Wis., 100 tons, to Worden-Allen Co.

Baseball park grand stand, Detroit, 500 tons, to The Russell Wheel & Foundry Co.

Structural Projects Pending

Inquiries for fabricated steel work which may be added to lists of pending projects include the following:

The New York Central Railroad, subway structure at Elyria, Ohio, tonnage not mentioned in inquiry; bids close Aug. 21.

Chesapeake & Ohio Railroad, bridge, 100 tons.

Building for General Electric Co., Schenectady, N. Y., 200 tons.

Building for Transit Commission at Lenox Avenue yards, New York, 125 tons.

Bascule bridge, Burnsham, Ill., 700 tons.

Louisiana & Arkansas Railroad, locomotive repair shop, 1311 tons.

Freight terminal for Illinois Central and Lake Erie & Western railroads at Indianapolis, tonnage unstated, plans completed but action deferred temporarily.

School building, Cincinnati, 400 tons.

Medical Center Building, Cleveland, 500 tons, bids taken.

St. Joseph's Home, Erie, Pa., 590 tons, bids taken.

Bolton Square apartment house, Cleveland, 700 tons.

Pennsylvania-Detroit freight house, Detroit, 1500 tons, bids taken.

Ingram Richardson Co., Bayonne, N. J., factory building, 300 tons, bids taken.

Steel plant, Otis Steel Co., Cleveland, 9000 tons.

Railroad Equipment Business

Although the formal inquiries have not been issued, it is known that three large railroads centering at Chicago will be in the market shortly for a total of 6500 new freight cars, and car builders are receiving many small contracts for car repairs pending a settlement of the rail strike.

The Burlington is expected to issue an inquiry this week for 2000 gondola cars.

The Illinois Central is inquiring for 75 caboose cars.

The Elgin, Joliet & Eastern has awarded 80 steel underframes to the General American Car Co.

The Indiana Coke & Gas Co., Terre Haute, Ind., has let repairs on 50 hopper cars to the American Car & Foundry Co.

The Chicago & North Western has issued an inquiry for 40 Mikado type and 10 Pacific type locomotives.

The Missouri, Kansas & Texas is inquiring for 40 Mikado type engines and 10 eight-wheel switchers.

The New York, Chicago & St. Louis has placed 15 additional locomotives with the Lima Locomotive Co.

The Seaboard Air Line has placed 600 freight car repairs with the Magor Car Co. in addition to the 400 reported placed with that company recently and it has awarded several hundred freight car repairs to the Richmond Car Works.

Orders received by the American Locomotive Co. include the following: Detroit Terminal Railroad Co., 2 switching engines; Public Service Co. of Northern Illinois, 1 switching engine; E. S. Tubarao A Ararangua (Brazil), 1 Mikado type engine; Wheeling Steel & Iron Co., 1 switching engine.

The Pacific Electric Co. is inquiring for 200 gondola cars.

Iron and Steel Markets

A SCARCITY MARKET

Prices Go Higher With Further Fall in Production

Operations on a 50 to 60 Per Cent Basis — Advances in Wire, Sheets and Pipe

The steel industry has suffered fresh losses in output in the past week, and there are indications that further crippling of blast furnaces and steel works will come before there is a turn for the better. More price advances and other aspects of a scarcity market have developed.

From a 65 to 70 per cent steel output last week the Steel Corporation is now down to about 60 per cent, and independent companies probably are not above 50 per cent on the average.

As in other weeks, blast furnaces are more seriously affected than steel works, and at least 13 furnaces have stopped in the second week of August—four in the Pittsburgh district, four at outside points in western Pennsylvania, three in eastern districts, one at Cleveland and one at Milwaukee.

Whatever the mining resumptions arranged at Cleveland may amount to, the steel industry is counting on little or no help from this source for weeks. Not only has the railroad strike caused the recent throttling of pig iron and steel production, but it is certain that when that strike ends the increased car and fuel supply will be turned into other than iron and steel channels.

Market changes of the week reflect the general belief of producers that for most if not all of the remainder of the year a rationing of steel supply will be the order. At Pittsburgh the mill schedules of the Carnegie Steel Co. have gone to a priority basis in which the order of preference is food containers, agricultural works, the oil industry and railroad car works.

Among important price developments is the opening of books of the American Sheet & Tin Plate Co. for fourth quarter business in sheets at 2.50c. base for blue annealed, 3.35c. for black and 4.35c. for galvanized—an advance of $2 per ton for the first named and $4 for black and galvanized.

An independent wire company has gone to $2.60 per keg for nails and to $2.35 for plain wire, or $4 and $2 respectively above Steel Corporation prices.

Several independent makers of standard pipe have advanced prices $6 per ton on black and $4 per ton on galvanized. The Steel Corporation and one independent are still on the old basis. Inquiry for line pipe includes 100 miles of 8, 10 and 12-in. and several thousand tons of 12-in. and 16-in.

Apart from the Steel Corporation nearly all producers of plates, shapes and bars have advanced those products, 2c. now being common for early delivery, with a range up to 2.25c. on urgent business.

Prices recently ruling on semi-finished steel now apply to such shipments as are being made on contracts. The small sales current are at $2 to $2.50 above the $35 level on billets and sheet bars and the $40 level on forging billets and wire rods.

In view of the tight mill situation, it is not surprising that warehouse prices have gone up in response to the piecing-out demand that is coming from all directions.

Buying of railroad cars still largely gives place to contracting for car repairs, but three Western roads are expected shortly to cover for 6500 new cars. Inquiries for 100 locomotives have appeared, and orders for 20 locomotives have been placed.

The sustained activity in fabricated steel work is shown in the figures for the last three weeks. Some 45,500 tons in 62 jobs, not including large oil tank business, were put under contract as compared with 46,700 tons for 61 jobs for the corresponding weeks a month ago.

The Standard Oil Co. has ordered 46 oil storage tanks in addition to the 33 reported last week, and about 31,000 tons of steel will be required for all the tank work just placed.

In the further advance of pig iron prices, due to inadequate supply of coke, foundry grades have taken the lead and in nearly all important centers have been marked up from $1 to $3 per ton. Basic and Bessemer have remained nearly stationary and a few transactions have been recorded at $1 below recent quotations. Important sales of the week include 7000 tons of foundry iron to the Pennsylvania Railroad, 4000 tons of copper-free low phosphorus to a wire company and 6000 tons of copper-bearing low phosphorus. Importers have contracted for large tonnages of foreign pig iron, in view of the increasing scarcity at home, but consumers in this country are disposed to be conservative about import orders.

The movement of iron ore shows improvement. The Great Northern, perhaps the most seriously affected by the rail strike, is now carrying about 90 per cent of the normal amount. Stocks of ore on Lake Erie docks increased 2,341,968 tons in July and on Aug. 1 stood at 7,396,842 tons.

Pittsburgh

Four More Blast Furnaces Added to Idle List —Prices Advancing

PITTSBURGH, Aug. 15.—The coal and railroad strikes still are exacting heavy tribute from the iron and steel industry, and as manufacturing activities dwindle and supplies become more limited, prices grow stronger. At the moment the coal strike situation is overshadowed by the railroad strike, which in several parts of the country is spreading to the train crews. The Pennsylvania and the Pittsburgh & Lake Erie railroads still are functioning in nearly normal shape, but west and south the railroads are suffering by the refusal of operating men to work on locomotives or cars on the pretext that they are in bad order. The present low rate of iron and steel plant activities is charged chiefly to the inability of Southern railroads to move coal, and the claim is made that enough coal could be had from

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 15, 1922	Aug. 8, 1922	July 18, 1922	Aug. 16, 1921
No. 2X, Philadelphia‡	**$33.14**	$31.14	$27.64	$20.34
No. 2, Valley furnace†	**30.00**	29.00	24.00	19.50
No. 2, Southern, Cin'ti†	24.05	24.05	21.53	23.50
No. 2, Birmingham, Ala.†	19.50	19.50	18.00	19.00
No. 2 foundry, Chicago*	**30.00**	27.00	24.00	20.00
Basic, del'd, eastern Pa.	27.25	27.25	25.75	19.00
Basic, Valley furnace	26.00	26.00	24.00	18.00
Valley Bess., del. Pitts.	28.76	28.76	26.77	21.96
Malleable, Chicago*	**30.00**	27.00	24.00	20.00
Malleable, Valley	28.00	28.00	24.50	20.00
Gray forge, Pittsburgh	**30.00**	28.76	25.27	21.46
L. S. charcoal, Chicago	33.15	33.15	31.65	33.50
Ferromanganese, seab'd	67.50	67.50	67.50	70.00
Rails, Billets, Etc., Per Gross Ton:				
O-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	35.00	35.00	35.00	30.00
O-h. billets, Pittsburgh	35.00	35.00	35.00	30.00
O-h. sheet bars, P'gh.	35.00	35.00	35.00	32.00
Forging billets, base, P'gh	40.00	40.00	40.00	35.00
O-h. billets, Phila.	42.67	42.67	40.17	35.74
Wire rods, Pittsburgh	**42.00**	40.00	40.00	42.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	**2.00**	1.80	1.70	1.75
Light rails at mill	**1.90**	1.75	1.75	1.85
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	**2.325**	2.025	1.925	2.05
Iron bars, Chicago	**2.15**	2.00	1.90	1.75
Steel bars, Pittsburgh	**1.90**	1.80	1.70	1.75
Steel bars, Chicago	1.90	1.90	1.75	2.13
Steel bars, New York	**2.24**	2.14	2.04	2.13
Tank plates, Pittsburgh	**1.90**	1.80	1.70	1.80
Tank plates, Chicago	1.90	1.90	1.75	2.18
Tank plates, New York	**2.34**	2.14	2.04	2.18
Beams, Pittsburgh	**1.90**	1.80	1.70	1.85
Beams, Chicago	1.90	1.90	1.75	2.23
Beams, New York	**2.24**	2.14	2.04	2.23
Steel hoops, Pittsburgh	2.50	2.50	2.50	2.25

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Aug. 15, 1922	Aug. 8, 1922	July 18, 1922	Aug. 16, 1921
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.15	3.15	3.15	3.00
Sheets, galv., No. 28, P'gh	4.15	4.15	4.15	4.00
Sheets, blue an'l'd, 9 & 10	2.40	2.40	2.40	2.25
Wire nails, Pittsburgh	2.40	2.40	2.40	2.75
Plain wire, Pittsburgh	2.25	2.25	2.25	2.50
Barbed wire, galv., P'gh	3.05	3.05	3.05	3.40
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$5.25
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$20.50**	$19.50	$19.50	$13.00
Carwheels, Philadelphia	17.50	17.50	17.50	16.00
Heavy steel scrap, P'gh	17.50	17.50	17.25	13.00
Heavy steel scrap, Phila.	15.00	15.00	15.00	11.50
Heavy steel scrap, Ch'go	**15.75**	15.50	15.50	10.75
No. 1 cast, Pittsburgh	19.00	19.00	19.00	16.00
No. 1 cast, Philadelphia	**19.00**	18.00	17.50	17.00
No. 1 cast, Ch'go (net ton)	**18.50**	18.00	17.00	13.00
No. 1 RR. wrot, Phila.	**18.00**	17.50	17.00	14.00
No. 1 RR. wrot, Ch'go (net)	**14.50**	14.25	13.50	11.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$14.00	$14.00	$11.00	$2.75
Foundry coke, prompt	15.00	15.00	11.00	3.75
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.12½	14.12½	14.00	12.00
Electrolytic copper, refinery	13.75	13.75	13.75	11.75
Zinc, St. Louis	*6.15*	6.30	5.75	4.20
Zinc, New York	*6.50*	6.65	6.10	4.70
Lead, St. Louis	**5.55**	5.50	5.50	4.25
Lead, New York	**5.90**	5.85	5.75	4.40
Tin (Straits), New York	*32.12½*	32.62½	31.50	26.12½
Antimony (Asiatic), N. Y.	5.25	5.25	5.00	4.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 15, 1922, Finished Steel, 2.255c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Aug. 8, 1922.	2.212c.
July 18, 1922.	2.169c.
Aug. 16, 1921.	2.364c.
10-year pre-war average.	1.689c.

Composite Price, Aug. 15, 1922, Pig Iron, $26.77 Per Gross Ton

Based on average basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Aug. 8, 1922.	$25.94
July 18, 1922.	23.61
Aug. 16, 1921.	18.89
10-year pre-war average.	15.72

the South to maintain a fairly high rate of steel works operations if the railroads could transport it.

There has been a further net loss of four blast furnaces in this district in the past week. The Jones & Laughlin Steel Co. has banked one furnace each of its Eliza and Aliquippa group, now having only three of 12 furnaces making iron. The Crucible Steel Co. and the Sharon Steel Hoop Co. each has blown out a furnace since a week ago. The Carnegie Steel Co. has put down the one active stack at its Farrell, Pa., works, but has turned on the blast at one of its Clairton, Pa., furnaces and still is operating 35 furnaces out of a total of 59. Steel works operations also are suffering. It is doubtful whether ingot production of the independent companies in this and nearby districts now exceeds 50 per cent of capacity, while the Carnegie Steel Co., which last week produced somewhat in excess of 70 per cent of capacity, is not expected to do much in excess of 60 per cent this week. This company is conserving its coal primarily for coke, and is maintaining operations of steel melting units having access to natural gas or fuel oil. The past week has developed a number of important changes marketwise.

The Carnegie Steel Co. has adopted a plan of scheduling its mills on a priority basis, whereby preference is given first to material for food containers, second for the requirements of the agricultural industry, third for the oil industry, in helping oil production for fuel, fourth steel for railroad cars and fifth for the requirements for roadwork and other public utilities. Although other companies are not adopting such a plan, it is equally difficult for buyers to obtain supplies other than of such lots as the mills have in stock or are reasonably certain of being able to produce.

A large independent producer of wire goods yesterday announced an advance of $4 per ton in plain and cement coated nails and of $2 in plain wire. Other manufacturers have not acted, but most of them have been largely out of the market for the past few weeks. Most independent makers to-day advanced prices of standard pipe $4 per ton on galvanized and $6 per ton on black. The American Sheet & Tin Plate Co. has notified its customers that prices of sheets for the last quarter of the year will be 2.50c. base for blue annealed, 3.35c. for black and 4.35c. base for galvanized. Electrical sheets are left at the present base.

The market is definitely stronger for plates, shapes and bars and on spot tonnages 2c. Pittsburgh is pretty common, and even has been exceeded on some urgent business. Higher prices seem immediately ahead for

semi-finished steel in view of the curtailment of production, not to mention the increasing cost of pig iron. Scrap prices hold strong in the face of a very light demand and supplies of fuel are still too limited to permit of any easing in prices.

Pig Iron.—The market continues to gain in strength, especially on foundry grades, due to the ability of consumers of these grades to maintain higher relative operations than the users of steel making iron. A sanitary ware manufacturer recently closed for 1500 tons of No. 2 and No. 2 X iron for early delivery, on a base of $29.50 Valley furnace for the base grade. No more of this grade seems to be available at that price, and on small tonnages $30 has been paid, and the demand from the foundries is so insistent that it is believed iron could be sold here out of Buffalo, where the price is $31, and the delivered price here would be slightly more than $34.25. Some fairly sizable sales of steel making grades, made prior to last reports, have come to light. One of these sales involves 5000 tons of basic at $25, Valley furnace, to a Pittsburgh district consumer, and another 2000 tons of Bessemer at $26, Valley furnace, for shipment to Wheeling. These prices are about $1 per ton below what now could be done, as producers are holding at $26, Valley furnace, for basic and $27 for Bessemer, and some small sales have been done at these prices. Sales of off basic iron are noted at $23 and $24, but stocks of such iron no longer are large. The Follansbee Brothers Co. is inquiring for 5000 tons of basic for September shipment. We note one sale of 200 tons of No. 3, or gray forge iron, at $30, delivered Pittsburgh, but it is believed that $30 furnace now could be done on this grade.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$26.00
Bessemer	27.00
Gray forge	28.25
No. 2 foundry	30.00
No. 3 foundry	28.25
Malleable	28.00

Ferroalloys.—The market in ferromanganese is a very limited one at present, due to the fact that with the decreasing steel works operations consumption is diminishing and consumers are too well covered to be actively interested in the market. Domestic producers at the moment are not actively seeking business because present indications are that the tariff will be in effect by Oct. 1, and they want to be free to act when this becomes a reality. Much of the current business is in less than carload lots at around $85 per ton, although one producer has announced a price of $100 at seaboard on such tonnages. It is claimed that carload lot sales have been made at more than $75 for prompt shipment. British material still is quotable as low as $67.50 c.i.f. Atlantic seaboard, for deferred delivery, but this price does not mean much in view of the fact that the tariff may be in effect by the time delivery can be made and the proposed duties added to this price would mean a cost to consumers of $100 per ton at seaboard. German material for delivery in six to eight weeks is priced at $67.50 to $70 seaboard. Demand for spiegeleisen, although relatively small, exceeds the available supply, and higher prices are looked for. In addition to an inquiry for 400 tons from a nearby consumer, an Ohio steel maker has inquired for 1000 tons for last quarter shipment.

We quote 78 to 82 per cent ferromanganese, $75 c.i.f. Atlantic seaboard for domestic; British, spot, $72.50; British, future, $67.50; German, 76 to 80 per cent, $67.50 to $70. Average 20 per cent spiegeleisen, $36 furnace; 16 to 19 per cent, $35 furnace; 50 per cent ferrosilicon, domestic, $55 to $60 furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $41.50; 11 per cent, $44.80; 12 per cent, $48.10; 13 per cent, $52.10; 14 per cent, $55.10; silvery iron, 6 per cent, $30; 7 per cent, $31; 8 per cent, $32.50; 9 per cent, $34.50; 10 per cent, $36.50; 11 per cent, $39; 12 per cent, $40.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Semi-finished steel is so scarce that few makers are in a position to entertain inquiries even for small tonnages that the price of $35 Pittsburgh or Youngstown, for sheet bars, slabs and large billets, now refers entirely to such shipments as are being made on contracts. Although demand is far from active, it considerably exceeds the available supply and those who must have tonnages in a hurry are finding it difficult to obtain accommodation, except at an advance of $2.50 to $3 per ton. Small sales of sheet bars are reported at $37.50 and it is doubtful whether slabs or large billets could be had today at less than that price. Labor shortages, as well as the scarcity of fuel, are affecting production. On forging billets $40 is merely the price on contract shipments and on new business for early delivery the market is quotable from $43 to $45.

We quote 4 x 4-in. soft Bessemer and open-hearth billets at $35 to $37.50; 2 x 2-in. billets, $35 to $37.50; Bessemer and open-hearth sheet bars, $35 to $37.50; slabs, $35 to $37.50; forging billets, ordinary carbons, $40 to $45, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—As a basis of sales, $40, base, for common soft rods appears to have disappeared. The leading interest is practically out of the market and those independents who might take on some tonnage hardly would do so at less than $43 while $45 is the price idea of one important maker. Actual business is kept down by the lack of supplies more than by a lack of demand.

We quote No. 5 common basic or Bessemer rods to domestic consumers, $43 to $45; chain rods, $43 to $45; screw stock rods, $48 to $50; rivet and bolt rods and other rods of that character, $43 to $45; high carbon rods, $50 to $55, depending on carbon, per gross ton, f.o.b. Pittsburgh or Youngstown.

Iron and Steel Bars.—Prices of steel bars are growing stronger in response to the curtailment of steel production and the inability of manufacturers to catch up with their obligations. Only attractive tonnages, and these for indefinite delivery, now can be placed as low as 1.80c., and several makers who are able to sell only such supplies as they have in stock are not interested at less than 2c. Reinforcing bars are held just as firmly as mild bars. There is no change in iron bars.

We quote steel bars rolled from billets at 1.80c. to 2c.; reinforcing bars, rolled from billets, 1.80c. to 2c. base; rail steel reinforcing bars, 1.70c. to 1.80c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—The question of deliveries is becoming more perplexing because the mills are finding it difficult to maintain production in the face of decreasing supplies of steel. The full range of prices is from 1.80c. to 2c. Pittsburgh, but the lower figure refers to definite tonnages of good-sized proportions and the Steel Corporation seems to be alone at that figure. Generally the independents are on a minimum of 2c., and it is reported that as high as 3c. recently was quoted on a lot of 200 tons of small channels. Fabricators are interested in a new building for the Hardy Candy Co., Pittsburgh, for which 2100 tons of steel will be required and other live projects are the fastenings for the five 100-ton open-hearth furnaces for the Wisconsin Steel Co., South Chicago, and steel for the filtration plant for Wheeling, W. Va. Plain material prices are given on page 449.

Plates.—The chief source of demand now is in connection with oil storage tanks, for which there is a very brisk demand, particularly from the Southwest, due to the fact that producers are inclined to store rather than to sell oil at current prices. The Steel Corporation price now is 1.80c. base, Pittsburgh, but independents are holding at 2c. minimum and some are asking and obtaining as high as 2.25c. on small tonnages for quick delivery. Prices are given on page 449.

Sheets.—The American Sheet & Tin Plate Co. prices for fourth quarter will be 2.50c. base on blue annealed, 3.35c. base on black and 4.35c. base on galvanized. There has been no formal opening of books for this period by the company and these prices, representing advances of $2 per ton on blue annealed and of $4 per ton in black and galvanized sheets, merely have been announced to the company's customers. It is estimated that current costs are at least $6 per ton higher now than they were in the second quarter and since present indications are that fuel and labor costs will be higher over the remainder of the year, losses could not be avoided if present prices were made for that period, but all are expected to follow the Steel Corporation. It is probable that makers generally will be unable to take on much fourth quarter business because the carry over from the present quarter promises to be large. Present prices are given on page 449.

Iron and Steel Pipe.—Effective today the Youngstown Sheet & Tube Co. has reduced discounts on stand-

ard pipe three points on black and two points on galvanized, equivalent to an advance of $6 a ton on the former and of $4 on the latter. Most of the other independent makers have made this advance, but as yet the Republic Iron & Steel Co. and the National Tube Co. have not acted. Oil country and line pipe quotations have been withdrawn by all companies except these two, and prices now are made only upon application. This advance is not altogether unexpected because costs have been rising steadily for some time, and it is stated that for several weeks business has been done for no profit or at a slight loss. Most producers are heavily committed on the butt weld sizes and on account of the difficulty in maintaining steel production a number of companies have found it necessary to resort to an apportioning of production. Orders in lap welded goods are relatively light, but the inquiry lately has been gaining. About four miles of various sizes of pipe are wanted for the new filtration plant for the City of Wheeling, W. Va., while the Phillips Petroleum Co. is in the market for 100 miles of 8-in., 10-in., or 12-in. pipe and several thousand tons of 12-in. and 16-in. light weight pipe is wanted by a coal producer with operation in West Virginia and Kentucky. The Foundation Co., which has the contract for the Empire Building additions and extension, is inquiring for about 800 tons of 12-in. plain end pipe, with ⅝-in. wall for foundations. Makers of wrought iron pipe are pretty well sold ahead on the merchant sizes. Discounts are given on page 449.

Warehouse Business.—Effective immediately, the Carnegie Steel Co. and Jones & Laughlin Steel Co. have advanced warehouse prices of hot-rolled steel products $2 per ton. The new quotations are 2.45c. for bars, 2.55c. for plates and shapes and 3.10c. for bands and 3.95c. for hoops.

Tin Plate.—Pressure for shipments on contracts does not appear to be so urgent as it was recently and the shortage of steel is not so much of a factor as it is in most other products. Some of the independent companies making a full line of steel products have suspended operations of some mills and diverted the steel to other uses. The American Sheet & Tin Plate Co., on the other hand, has increased its active tin plate capacity, due to the fact that it has been able to get Bessemer steel. Few makers have very extensive obligations extending beyond Oct. 1 and all probably will be able to meet the bulk of them. There is no change in prices, the official quotation being $4.75 per base box, Pittsburgh, with the usual concessions from this figure to the large and preferential consumers.

Wire Products.—Effective immediately, the Pittsburgh Steel Co. has advanced the price of nails to 2.60c. base per keg, Pittsburgh, cement coated nails to 2.10c. base per count keg, and wire to 2.35c. base per 100-lb. These prices represent an advance of $4 per ton in nails, and $2 per ton in wire, which carries a corresponding increase in galvanized and barbed wire and in staples. The American Steel & Wire Co. has not changed its prices, but this company, as well as most of the independents, practically is out of the market and now, as for the past few weeks, is merely taking on such business as can be supplied from stock or have a supply of steel sufficient to insure full performance of obligations. Those companies making sales of nails out of stock have been charging $2.50 base per keg, Pittsburgh. The Pittsburgh Steel Co. appears to be faring better than most other companies in the matter of maintaining operations, but with labor so scarce and fuel costly, the company claims to have been losing money at recent prices. Quotations are given on page 449.

Steel Rails.—The Carnegie Steel Co. has raised its price on light rails from 1.75c. base to 1.90c. Independent makers of these rails, rolling them from new steel, are quoting 2c. base. Business is not very brisk and sales usually are in small lots, but the shortage of steel is beginning to tell on the available supplies.

We quote 25 to 45-lb. sections, rolled from new steel, 1.90c. to 2c. base; rolled from old rails, 1.75c. to 1.80c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Coke and Coal.—Available supplies still are extremely limited and the market is entirely a sellers' affair. Coal still commands from $7 to $8 per ton at mines, and the limited tonnages of beehive oven coke reaching the market are moving at from $14 to $15 per net ton at ovens for furnace grade and from $15 to $16 for that going to the foundries. The quality of current offerings of coke is very poor and it is claimed by some of the steel companies that from 2500 to 2900 lb. of present day coke are required for a ton of high iron. Good practice on basic iron is from 1800 to 2000 lb.

Cold-Finished Steel Bars and Shafting.—This line is firm in price, but the explanation is to be found in the strong market in hot-rolled bars rather than in the demand, which already is beginning to reflect the enforced curtailment of automobile production, due to the inability of that industry to get as large supplies of other kinds of steel as are required. All makers of rolled, drawn and turned bars are quoting 2.25c., base, Pittsburgh, for carloads and 2.50c. for less carloads. Ground shafting is unchanged at 2.65c., base, f.o.b. mill, for carloads and 2.90c. for less carloads.

Hot-Rolled Flats.—There is no easing in the price or supply situation. Mills are committed against probable production for the next 30 days and on account of the steel and fuel supply situation are not anxious for additional business at present prices. On the easily-rolled widths, the market is quotable at 2.50c., base, Pittsburgh, but on narrow stock, 2.75c., base, has become the common price and is sometimes demanded on wide material where prompt delivery is insisted upon.

Old Material.—No good reason exists for materially changing prices. The steel mills are doing very little buying and in the Youngstown district, on account of the contraction in operations forced by the fuel shortage, the mills are holding up shipments on contracts. Because the railroads are not pressing for shipping instructions on material sold, owing to the shortage of coal and the labor troubles, market offerings are quite as small as the demand. The result is a firm market. Railroad or industrial heavy melting steel, is not available at less than $17.50 and one company in this district requiring some good material recently paid $18.50 on 5000 tons. On the other hand, we note sales amounting to 1500 tons of material sold as heavy melting steel at $16.50. The full range on this grade, therefore, would be $16.50 to $18.50, but on a typical specification, the scrap sold at $16.50 would not find acceptance in local mills as heavy melting grade. Compressed sheets are slightly weaker; the highest price recently paid by any of the mills in this district was $16 and while few sellers would accept less, that is about all that can be obtained at the moment. Some users are bidding $15.50, but are not able to obtain tonnages.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows per gross ton:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$17.50
No. 1 cast, cupola size	$19.00 to 19.50
Rails for rerolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	17.50 to 18.00
Compressed sheet steel	16.00
Bundled sheets sides and ends	15.00
Railroad knuckles and couplers	19.00 to 19.50
Railroad coil and leaf springs	19.00 to 19.50
Low phosphorus standard bloom and billet ends	21.00 to 22.00
Low phosphorus plates and other grades	19.00 to 20.00
Railroad malleable	16.50 to 17.00
Iron car axles	27.00 to 28.00
Locomotive axles, steel	25.00 to 26.00
Steel car axles	19.00 to 19.50
Cast iron wheels	19.00 to 19.50
Rolled steel wheels	19.00 to 19.50
Machine shop turnings	14.00 to 14.25
Sheet bar crop ends	19.00 to 19.50
Heavy steel axle turnings	15.00 to 15.50
Short shoveling turnings	15.00 to 15.50
Heavy breakable cast	18.00 to 18.50
Stove plate	14.50 to 15.00
Cast iron borings	15.50 to 16.00
No. 1 railroad wrought	15.00 to 15.50

Chicago

Further Curtailment Regarded Certain — Pressing Pig Iron Demand

CHICAGO, Aug. 15.—An immediate resumption of coal mining will not end the difficulties of iron and steel works. So far as they are concerned the damage has been done. Owing to the priorities ruling, it will take so long for them to get additional coal that it is certain that additional blast furnaces will be banked and steel output will suffer further curtailment. Since last writing one additional blast furnace in this district has become inactive, the Bay View merchant stack of the Illinois Steel Co. at Milwaukee having been banked. This is the seventh furnace of this company to be thrown idle in three weeks, six having been banked and one blown out. There are now only 23 active stacks out of a total of 49 in the Chicago, Milwaukee and Duluth districts.

Steel output is also declining. The production of the Illinois Steel Co. has dropped from 78 per cent of ingot capacity to 67 per cent within the past week. The Inland Steel Co. is still on a 65 per cent basis, but it is felt that a reduction to a 30 per cent basis by the middle of September is inevitable. Some of the smaller mills are face to face with the necessity for shutting down altogether. A local bar iron mill has scarcely two weeks' supply of fuel on hand and entertains little hope of securing additional supplies in time to avert suspension of operations. Consumers are also in distress for fuel and this is particularly true of gray iron and malleable foundries.

Demand for prompt foundry coke is very pressing and prices no longer concern the buyer so long as delivery can be secured. Spot inquiries for pig iron are also numerous with the available supply steadily diminishing. Local merchant pig iron has again advanced, this time to $30, base furnace. Among finished products, bar iron and hard steel bars have advanced, while warehouse prices have generally gone up.

Demand for finished steel shows remarkable buoyancy. For a leading local mill new tonnage booked last week was above the average, despite the fact that orders are accepted only for delivery at mills' convenience. These new commitments consist largely of plates, shapes and bars for buildings and storage tanks, although a fair amount of track fastening business was also booked. It is notable, however, that new orders from both railroads and car builders have fallen off, although specifications from the latter are still heavy. On steel for early delivery Pittsburgh base prices rule, as little material is to be obtained from local sources.

Pig Iron.—Local merchant iron has advanced to $30, base furnace. The Bay View stack of the Illinois Steel Co. was banked Monday and further furnace bankings in this district are regarded as inevitable. Demand for spot iron is exceedingly pressing. The situation is acute and is growing steadily worse rather than better, as production in this district declines and shipments from other centers are shut off. Quotations on Southern iron, in fact, have become practically nominal at $20 to $21, base Birmingham, owing to the fact that furnaces find it exceedingly difficult to move shipments beyond the Ohio River. Local producers are finding it necessary to allocate their output among their customers in an effort to tide them over the period, but even in this they are impeded by car shortage, freight blockade and the strike of train service employees on the Elgin, Joliet & Eastern. Among recent transactions may be noted sales of 300 tons of Southern foundry for fourth quarter delivery at $20, base Birmingham, and 300 tons of malleable for immediate shipment. A Michigan automotive plant wants 2000 tons of foundry for early delivery. Another Michigan automotive concern has placed 1000 tons of 9 per cent silvery for August and September shipment at $38, Jackson furnace. A Wisconsin melter has closed for 500 tons of 8 per cent silvery. Jackson County furnaces have withdrawn all prices, but material can still be obtained from electrolytic producers on a basis of $36, f.o.b. Jackson, for 8 per cent. An inquiry for 400 tons of low phosphorus is current, and the quotation on copper free material is about $36, Valley. A local melter has closed for 400 tons of 14 per cent Bessemer ferrosilicon at a reported price of approximately $40, delivered.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.15
Northern coke, No. 1, sil. 2.25 to 2.75	31.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	30.00
Northern high phos	30.00
Southern No. 2	$26.00 to 27.00
Malleable, not over 2.25 sil	30.00
Basic	30.00
Low phos. Valley furnace, sil. 1 to 2 per cent copper free	36.00
Silvery, sil. 8 per cent	40.79

Ferroalloys.—Spiegeleisen is stronger, prices ranging from $47 to $49, delivered. Neither spiegeleisen nor ferromanganese is active.

We quote 78 to 82 per cent ferromanganese, future, $75.06; prompt, $82.56, delivered; 50 per cent ferrosilicon, $57, delivered; spiegeleisen, 18 to 22 per cent, $47 to $49, delivered.

Bars.—Bookings in mild steel bars for indefinite delivery are heavy, while material for early shipment is scarce and is commanding 1.90c. to 2c., base Pittsburgh. With their operations rendered uncertain by the coal strike and with their books well filled, bar iron mills are picking their new orders. Prices have again advanced, the ruling market on bar iron being 2.15c. to 2.25c., Chicago. The minimum price on rail carbon steel bars is now 1.80c., Moline, or 1.955c., Chicago. The two Chicago Heights mills are still tied up by a strike.

Mill prices are: Mild steel bars, 2.15c. to 2.25c., Chicago, for indefinite delivery; common bar iron, 2c., Chicago; rail steel, 1.955c., mill or Chicago.
Jobbers quote 2.70c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.70c. for rounds and 4.20c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 3.70c.; bands, 3.45c.

Bolts and Nuts.—As the costs of makers increase, discounts are growing increasingly firm on the July 1 basis and the May 11 prices are now a thing of the past. Discounts on page 449 apply in this territory except that they are f.o.b. Chicago, instead of f.o.b. Pittsburgh.

Jobbers quote structural rivets, 3.35c.; boiler rivets, 3.45c.; machine bolts up to ¾ x 4 in., 50, 10 and 10 per cent off; larger sizes, 50 and 10 off; carriage bolts up to ⅝ x 6 in. 50 and 5 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $3.25 off; blank nuts, $3.50 off; coach or lag screws, gimlet points, square heads, 60 per cent off; quantity extras are unchanged.

Wire Products.—An Eastern independent has advanced wire nails to $2.60, cement coated nails to $2.10 and plain wire to $2.35. The leading interest, however, has made no change in prices and has given no intimation that advances are contemplated. New business is heavy, but it is suspected that some buyers have been stampeded into placing orders by the two national strikes. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 449.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $2.95 per 100 lb.; common wire nails, $3.10 per 100 lb.; cement coated nails, $2.60 per keg.

Sheets.—Users are now dependent largely on Eastern mills for new supplies and are finding it difficult to place orders for early shipment. Galvanized is particularly scarce.

Mill quotations are 3.15c. to 3.30c. for No. 28 black, 2.40c. to 2.50c. for No. 10 blue annealed and 4.15c. to 4.30c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.
Jobbers quote blue annealed, 3.90c.; black, 4.60c.; galvanized, 5.60c.

Structural Material.—Structural mills continue to receive liberal orders for indefinite delivery, indicating that building activity is still buoyant in spite of the hindrances due to the two nation-wide strikes. Fabricating awards are still fairly numerous and some attractive new projects are making their appearance. Plain material for early shipment is bringing as high as 2c. and 2.10c., base Pittsburgh.

The mill quotation on plain material for indefinite delivery is 1.90c. to 2c., Chicago. Jobbers quote 2.80c. for plain material out of warehouse.

Plates.—The Standard Oil Co. has placed 46 oil storage tanks of 80,000 barrels capacity in addition to the 33 tanks reported awarded last week. Of the total of 79 tanks, 42 will be fabricated by the American Bridge Co. and 37 by the Chicago Bridge & Iron Works. Fully 24,000 tons of steel is involved. New orders for plates are above the average in tonnage, notwithstanding the fact that local mills are booking only for indefinite delivery. Specifications from carbuilders are heavy. Plates for early shipment are commanding 2c. Pittsburgh.

The mill quotation for indefinite delivery is 1.90c. to 2c., Chicago. Jobbers quote 2.80c. for plates out of stock.

Reinforcing Bars.—Reinforcing bar distributors still have fair stocks of bars on hand, but replenishments from the mills are becoming so uncertain that they are selling cautiously, concentrating their attention on satisfying the imperative needs of customers. In line with the recent advance in mill prices, bar distributors have raised their warehouse quotation on reinforcing bars to 2.50c., Chicago. The paralyzing effect of the railroad and coal strikes is commencing to be felt and it is notable that fewer new building projects involving bars are appearing. Considerable highway work, however, is still in prospect. Recent awards include:

Advance-Rumely Co., warehouse, Omaha, Neb., 210 tons, to Concrete Steel Co.

Kansas City Title & Trust Co., building, Kansas City, Mo., 135 tons, to Concrete Steel Co.

High school, Maquoketa, Iowa, 120 tons, to Concrete Steel Co.

Convent, Milwaukee, Wis., 70 tons, to Concrete Steel Co.

Pending business includes:

Illinois State Highway Commission, highway work, 1200 tons, bids to be opened Aug. 18.

Chicago, Burlington & Quincy Railroad, two-story addition to Chicago freight house, 100 tons.

Wisconsin General Hospital, Madison, Wis.; 350 tons, to Corrugated Bar Co.

Cast-iron Pipe.—Shops located in the South are finding it difficult to make deliveries north of the Ohio River. Inquiry is not so active on account of the season and the national strikes. Minneapolis took bids yesterday on 1100 tons and Roanoke, Ill., receives tenders on 110 tons Aug. 29. Detroit takes bids today on 800 tons, instead of 200 tons as stated last week. Hinsdale, Ill., has placed 100 tons with the American Cast Iron Pipe Co. and is in the market for 1100 tons additional.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $50.20 to $51.20; 6-in. and above, $46.20 to $47.20; Class A and gas pipe, $3 extra.

Rails and Track Supplies.—New business in rails is light, a few orders aggregating 2000 tons having been placed by frog and switch makers. Four large Western roads, however, are working out their 1923 requirements with the likelihood that formal inquiries will be issued within a few weeks. Track fastening orders are still fairly numerous. Standard spikes are now quoted at a minimum of 2.60c. Chicago, while the bottom on track bolts is 3.60c. Chicago.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.75c., f.o.b. makers' mills.

Standard railroad spikes, 2.60c. to 2.75c., Pittsburgh; track bolts with square nuts, 3.60c. to 3.75c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.40c. base and track bolts 4.40c. base.

Steel Castings.—Most outstanding castings business has been closed and foundries are generally running full or nearly so. Due to a widespread use of oil in the open hearths, the coal strike has not forced curtailment of operation. Costs, however, are increasing, and an early advance in prices is looked for.

Warehouse Prices.—Local warehouses have announced advances of 10c. per 100 lb. on bars, plates, shapes, hoops, bands, rivets, track spikes, and bolts, and 15c. per 100 lb. on sheets, cold rolled bars and shafting. The new quotations are to be found under the appropriate paragraphs.

Coke.—The local by-product producer has advanced foundry coke to $13.50, delivered Chicago switching district. For Milwaukee the price is now $13.50, f.o.b. Milwaukee ovens. Demand for prompt foundry coke has almost reached the point of a panic. Mills are no longer concerned about prices; they want deliveries to avert a shut-down. There is practically no Connellsville coke reaching here. Some shipments of New River coke, which is quoted at $12, ovens, have managed to get through, and the same can be said of some brands of Southern coke, which are bringing $13 to $13.80, delivered Chicago. The available supply of coke, however, does not meet the demand, and if foundries are forced to shut down it will be due more largely to lack of fuel than of pig iron.

Old Material.—Current demand is widely distributed and is principally for small tonnages for prompt shipment. Gray iron, malleable and steel foundry grades are notably active, but there is little movement of iron mill grades or heavy melting, the last important sale of the latter having been made ten days ago. Railroads are not only tardy in making shipments, but their new offerings are almost nil. This fact, coupled with a general shortage of scrap for prompt shipment and an effort on the part of numerous users to hasten deliveries from sellers, has given the market added strength, numerous grades having advanced. The Chicago Great Western offers 200 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$19.50 to $20.00
Cast iron car wheels	20.50 to 21.00
Relaying rails	22.50 to 27.50
Rolled or forged steel car wheels	19.00 to 19.50
Rails for rerolling	16.50 to 17.00
Steel rails, less than 3 ft	18.50 to 19.00
Heavy melting steel	15.75 to 16.25
Frogs, switches and guards cut apart	15.75 to 16.25
Shoveling steel	15.25 to 15.75
Drop forge flashings	11.50 to 12.00
Hydraulic compressed sheet	13.00 to 13.50
Axle turnings	14.00 to 14.50
Per Net Ton	
Iron angles and splice bars	18.50 to 19.00
Steel angle bars	15.00 to 15.50
Iron arch bars and transoms	19.00 to 19.50
Iron car axles	23.50 to 24.00
Steel car axles	16.20 to 16.75
No. 1 busheling	13.00 to 13.50
No. 2 busheling	7.50 to 8.00
Cut forge	14.25 to 14.75
Pipes and flues	11.00 to 11.50
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	14.25 to 14.75
Steel knuckles and couplers	17.00 to 17.50
Coil springs	17.50 to 18.00
No. 1 machinery cast	18.50 to 19.00
No. 1 railroad cast	17.00 to 17.50
Low phos. punchings	15.00 to 15.50
Locomotive tires, smooth	13.50 to 14.00
Machine shop turnings	9.50 to 10.00
Cast borings	11.50 to 12.00
Stove plate	14.75 to 15.25
Grate bars	15.00 to 15.50
Brake shoes	15.25 to 15.75
Railroad malleable	17.00 to 17.50
Agricultural malleable	17.00 to 17.50

Activity in Springfield, Ohio

SPRINGFIELD, OHIO, Aug. 8.—All three piano plate plants in this city are operating with good-sized forces. The manufacturers say that they look for a steady improvement in business. Owing to the receipt of substantial orders for water turbines the James Leffel & Co.'s plant started Monday on a late run. The plant is now being operated until 8.15 p. m., according to announcement made by President A. F. Sparks. The present demand is for medium-sized turbines.

The next meeting of the district association of the Ohio Foundrymen's Association will be held in Springfield in September. The Ohio association will meet in Cleveland next month.

General Manager George Ireland, of the Steel Products Engineering Co., reports orders for dies and tools for automotive manufacturers in Detroit. These orders and others from the Government will require running overtime.

Although general prospects are good, there has been a slowing up at the plant of the Buffalo-Springfield Roller Co. The company is constructing an addition, 60 x 150 ft., to be used as an assembly room.

Equipment for Open-Hearth Plant

CHICAGO, Aug. 15.—The Wisconsin Steel Works, South Chicago, has let orders for the following equipment for its new open-hearth plant to the Alliance Machine Co., Alliance, Ohio: One 175-ton ladle crane, one 100-ton ladle crane, two open-hearth charging machines, two 10-ton overhead electric traveling cranes, one spare 10-ton trolley, two 7½-ton overhead electric traveling cranes.

New York

Little Steel Buying and Prices Higher—Large Sale of Low Phosphorus Iron

NEW YORK, Aug. 15.—Troubles connected with the delivery of coal and coke continue. While pig iron prices advance only moderate relief is furnished by foreign importations, although some coal as well as pig iron is being received from England and much more is expected. In finished steel, a majority of the mills are out of the market and those selling are dealing as a rule only with their regular customers. Quotations are $1 and $2 higher than a week ago on such business as can be placed.

Pig Iron.—A sale of 4000 tons of copper free low phosphorus iron has been made by a Northern New York furnace for delivery at Worcester, Mass., the price being somewhat under $35, furnace. Very little of this grade is obtainable. Following sales amounting to about 2000 tons, one seller of foundry pig iron has advanced to a price of $31 for No. 2 plain and $32 for No. 2X for early delivery. The Bethlehem Steel Co. has opened its books for fourth quarter at the following prices: No. 2 plain, $30; No. 2X, $31; No. 1X, $33, at furnace. It is believed that there will be no trouble in making sales for early delivery on the basis of $30 for No. 2 plain, although the last sales were $1 lower. The scarcity of domestic iron is more pronounced and sellers of foreign grades are more active, but the only new sale amounting to any considerable tonnage was 1000 tons of foundry iron to be imported from England. Prices of foreign iron are advancing and the minimum on Scotch, analyzing from 2 to 3 per cent silicon, now seems to be $28, while as high as $30 is asked. On high phosphorus iron from England and the Continent, there is a wide range in prices, from $22 to $27 being quoted. Buyers are not placing orders for foreign irons with much enthusiasm, owing to the uncertainty as to delivery and analysis. For delivery within Greater New York, a charge of about $1.50 must be added to the seaboard quotation.

Coke.—Difficulties in delivering coke are still great and prices high. For Connellsville grades, $14.25 to $14.75 is quoted for furnace coke and $15.50 to $16.50 for foundry. For by-product coke the nominal quotation is $14, but owing to an order of the New Jersey Fuel Commission requiring priority to be given public utility companies, very little can be delivered to foundries at present. A sale of coke for shipment from Terre Haute, Ind., to Buffalo was made on a basis of $12.50, Terre Haute ovens.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$33.77 to $34.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	32.77 to 33.27
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	31.77 to 32.27
Buffalo, sil. 1.75 to 2.25	32.91 to 33.91
No. 2 Virginia, sil. 1.75 to 2.25	31.44 to 32.44

Warehouse Business.—All warehouses including the Carnegie Steel Co. and the leading independent have increased prices. Bars, shapes and plates have been advanced 10c. per 100 lb. Hoops and bands have risen 25c., the quotation now being 3.63c. One large warehouse states that the market is stronger than it has been for the past two years. Blue annealed sheets have advanced 15c., now being quoted at 3.93c. No change has been marked in black or galvanized. Mill quotations on spring steel, which now range up to 2.35c. per lb. base, Pittsburgh, are being quoted consistently at 4c. at all warehouses. Brass and copper remain steady, the only change being noted in cold-rolled copper sheets, 14 oz. and heavier, which are quoted at 3c. advance over hot-rolled. The spread between mill and warehouse continues at about $12 per ton.

Cast Iron Pipe.—Prices are strong and some foundries have increased quotations slightly. While foundries in this district are fairly well situated for pig iron, the coal shortage is being felt as shipments received become smaller. No municipal buying is in evidence at present, probably because of the realization by cities that purchases now would be rather uncertain as to delivery. The low bidder on the 2500 tons of pipe for the city of Poughkeepsie was the Warren Foundry & Machine Co., but alternate bids were also received on steel pipe and decision has not been made as to the type which will be purchased. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe.

Ferroalloys.—Sales of one lot of 500 tons and several lots of 50 and 100 tons each of British ferromanganese are reported for September and September-October shipment at the prevailing quotation of $67.50, seaboard. There is a fair demand for spiegeleisen and some domestic 20 per cent alloy is available at an advanced price of $3 per ton, or $39, furnace. One lot of British spiegeleisen has reached the seaboard and a little more is on the way. Buying of 50 per cent ferrosilicon is confined to small and carload lots at the prevailing quotations which are unchanged. No activity is reported in Brazilian or Indian manganese ore, but the receipt of several cargoes of Russian ore is reported. Quotations are as follows:

Ferromanganese, domestic, seaboard, per ton	$67.50 to $70.00
Ferromanganese, British, seaboard, per ton	$67.50 to $70.00
Spiegeleisen, 17 to 19 per cent	$38.00
Spiegeleisen, 20 per cent	$39.00
Ferrosilicon, 50 per cent, delivered, per ton	$52.00 to $55.00
Ferrosilicon, 10 to 15 per cent, delivered, per gross ton	$38.00 to $40.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	12c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.00 to $3.50
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00
Ores	
Manganese ore, foreign, per unit, seaboard	28c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$3.25 up
Chrome ore, basis 48 per cent Cr_2O_3, crude, per ton, Atlantic seaboard	$15 to $18.50
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	45c. to 50c.

Old Material.—The market continues strong and some prices show an upward tendency. Most of the present buying is from eastern Pennsylvania mills. Western Pennsylvania mills are extremely particular at present as to quality and are inclined to reject when material is not entirely up to grade. No. 1 heavy melting steel continues firm, while railroad steel is now quotable at $11.75 to $12.25 per ton. There are some inquiries current from Japanese export houses for heavy melting steel for Japan, but the price evidently expected by these buyers is about $13 to $14 per ton, f.a.s. port.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$10.50 to $11.50
Steel rails, short lengths, or equivalent	11.75 to 12.25
Rerolling rails	12.50 to 13.00
Relaying rails, nominal	27.00 to 28.00
Steel car axles	17.00 to 18.00
Iron car axles	22.00 to 23.00
No. 1 railroad wrought	12.50 to 13.00
Wrought iron track	11.50 to 12.00
Forge fire	8.00 to 8.50
No. 1 yard wrought, long	11.00 to 11.50
Cast borings (clean)	9.75 to 10.75
Machine-shop turnings	9.25 to 10.25
Mixed borings and turnings	9.25 to 10.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	9.00 to 9.50
Stove plate	11.00 to 11.50
Locomotive grate bars	11.50 to 12.00
Malleable cast (railroad)	10.50 to 11.00
Cast-iron car wheels	13.50 to 14.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$18.00 to $19.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.50 to 17.00
No. 1 heavy cast, not cupola size	13.00 to 13.50
No. 2 cast (radiators, cast boilers, etc.)	12.00 to 12.50

Finished Iron and Steel.—Very little business in finished steel is being done because of the mill situation due to coal and coke shortage. A few companies are in fairly comfortable position and are taking orders moderately, but the majority of steel companies are entirely out of the market. Those which have anything to sell are taking care of their own customers principally and at prices which usually range from 2c., Pittsburgh, upward for plates, shapes and bars when prompt delivery is required. Plates are quoted from 2c. to 2.15c.; soft steel bars at 1.90c. to 2.15c. and shapes at 1.90c. to 2c., Pittsburgh. Bar iron makers now quote 1.80c., Pittsburgh, or higher for carload lots. The New

York Central has asked for bids by Aug. 21 on 30,000 railroad spikes. A sale of 100 tons of soft steel billets at $37, Pittsburgh, by an Eastern mill for shipment to New England illustrates the strength of the semi-finished market.

We quote for mill shipments, New York delivery, as follows: For indefinite delivery soft steel bars, structural shapes and steel plates, 2.14c.; for delivery in a number of weeks, soft steel bars, 2.24c. to 2.49c.; plain structural material, 2.24c. to 2.34c.; steel plates, 2.34c. to 2.49c.; bar iron, 2.34c.

Buffalo

BUFFALO, Aug. 15.

Pig Iron.—Seven furnaces are now in operation in this district, but it is generally believed that there will be about 50 per cent curtailment of this operation before the end of the current month. The one interest which has had iron to sell is rather reluctant to handle the volume of business available and has virtually adopted a policy of selling only to regular trade. This situation was brought about through the exhaustion of its stock of piled iron and the fact that the product of the one furnace in operation is being sold rapidly. There are no big inquiries coming into the Buffalo district; tonnages usually being from carload lots to 100 tons. There is no bright prospect with reference to the fuel situation in this vicinity and pig iron men generally feel that the situation will be worse before it is better. On scattered sales, prices range from $30 to $32 base. A broker sold a small lot of No. 2X iron for $31, whereas $32 has been done for No. 2 plain filling an emergency order. The Lackawanna Steel Co. has banked two of the four blast furnaces in operation.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$32.00
No. 2X foundry, 2.25 to 2.75 sil.	31.00
No. 2 plain, 1.75 to 2.25 sil.	30.00
Basic	26.00
Malleable	30.00
Lake Superior charcoal	33.28

Finished Iron and Steel.—Except on cold finished material, black sheets and bolts, there is hardly any other sales activity in this district. Occasionally small tonnages of bars are sold, but these sales are made conditional on immediate specifications and at a minimum of 2c. Some inquiries for small tonnages of reinforcing bars have come out within a few days. The one selling agency taking business in black sheets has established a base price of $3.30, but is not taking any galvanized business whatever. While the local branch of an independent which does a large business in tin plate has not withdrawn on this product, it is not pressing the selling but has withdrawn within the week on wire, pipe and spikes.

Warehouse Business.—Prices on cold-rolled round shafting advanced to 3.80c., effective Monday, Aug. 14, and further advances all along the line are expected before many days. A majority of buyers seeking warehouse material are asking for tonnages greater than warehouses can supply at the time. There is every likelihood that merchant business will be active throughout the remainder of the year, regardless of how quickly the coal and rail difficulties are settled.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 2.85c.; plates, 2.85c.; soft steel bars, 2.75c.; hoops, 3.55c.; bands, 3.40c.; blue annealed sheets, No. 10 gage, 3.80c.; galvanized steel sheets, No. 28 gage, 5.60c.; black sheets, No. 28, 4.60c.; cold rolled round shafting, 3.80c.

Old Material.—Only one mill is buying heavy melting steel, while the others are not out of the market, but they are inactive for the present. There is a good demand for machinery cast scrap and low phosphorus and both grades of old material are scarce. Dealers are finding it difficult to obtain cars to ship material on old contracts.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$16.75 to $17.00
Low phos., 0.04 and under	18.00 to 19.00
No. 1 railroad wrought	16.00 to 16.50
Car wheels	17.00 to 18.00
Machine shop turnings	10.50 to 11.00
Cast iron borings	14.00 to 14.50
Heavy axle turnings	14.00 to 14.50
Grate bars	14.00 to 14.50
No. 1 busheling	15.00 to 15.50
Stove plate	15.00 to 15.50
Bundled sheet stampings	11.50 to 12.00
No. 1 machinery cast	18.50 to 19.50
Hydraulic compressed	15.00 to 15.50
Railroad malleable	17.00 to 17.50

St. Louis

ST. LOUIS, Aug. 15.

Pig Iron.—The week was marked by an active demand and increased prices in pig iron. The price of Northern iron has advanced to $28, f.o.b. Chicago for prompt shipment and $27 for shipment during the rest of the year, with a premium of $2 a ton for silicon 2.25 to 2.75. Southern iron is quoted at $20 to $21, Birmingham, but the railroad strike has so hampered shipments that there is virtually no movement of iron from the Birmingham district. The coal strike is making it increasingly difficult to produce iron. The Granite City maker is still on a 100 per cent production basis, and has made arrangements to move coal from the Kentucky fields by barge. Buying is more active, as users who thought they had been fully protected in their purchases now find they cannot get iron they had counted on and are looking about for material they will need. There is also an active demand for iron for third and fourth quarter delivery, and there is one inquiry before the market for 300 tons for first quarter of next year. There is still a most pressing demand for iron of high silicon. The principal sales of the Granite City maker were 850 tons of malleable for shipment to Ohio; 500 tons of malleable to an Indiana melter, and 100 tons to an Illinois foundry. Inquiries are being received here from Indiana and Ohio melters, who usually look to other markets for their supplies. The principal inquiries before the market are: 1000 tons of foundry iron for a South Bend, Ind., melter; 500 tons for another Indiana melter; 300 tons for a Columbus, Ohio, concern; 200 tons for a Quincy, Ill., user, 300 tons for a Terre Haute melter, and 400 tons for delivery September to December. The markets for ferroalloys are quiet this week.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago and $5.17 from Birmingham and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25 (forward delivery)	$29.16
Northern malleable, sil. 1.75 to 2.25 (forward delivery)	29.16
Basic (third quarter)	29.16
Southern foundry, all rail, sil. 1.75 to 2.25	$25.17 to 26.17

Finished Iron and Steel.—The shortage of coal is curtailing production at steel mills so that it is becoming more and more difficult to place business. This fact seems to be generally recognized by the trade, and inquiries are being confined largely to material for which there is immediate need. The largest railroad inquiry of the week for material was from the Missouri-Kansas-Texas Railroad, which is in the market for 800 kegs of standard track spikes, the other inquiries being for material such as could be gotten readily from warehouse stock. The Wabash order for 240,000 tie plates, which inquiry was reported in THE IRON AGE of last week, went to the Illinois Steel Co., at a price understood to be $37, f.o.b. Chicago. A Tulsa manufacturer who last week bought 1000 tons of tank plates, bought 2000 additional tons this week, and there continues to be an active demand for tanks from the Oklahoma oil fields, a situation largely aided by the shortage of coal. Bids have been asked on the Shrine Hospital, St. Louis, W. B. Ittner, architect, involving about 200 tons of billet reinforcing bars, and the Bankers' Reserve Life Building, Omaha, F. A. Henninger, architect, in which 700 tons of structural steel will be used. The demand for tool steel is very active, a leading factor in the trade reporting that sales for August were much larger than for any month this year. Sheets are in good demand, but the mills seem to have none to offer.

For stock out of warehouse we quote: Soft steel bars, 2.70c. per lb.; iron bars, 2.70c.; structural shapes, 2.80c.; tank plates, 2.80c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, cold rolled, one pass, 4.45c.; cold drawn rounds, shafting and screw stock, 3.50c.; structural rivets, $3.35 per 100 lb.; boiler rivets, $3.45; tank rivets, ⅞ in. and smaller, 60 per cent off list; machine bolts, large, 50 and 10 per cent; small, 50-10 and 10 per cent; carriage bolts, large, 55-5 per cent; small, 60 and 10 per cent; lag screws 60 per cent; hot pressed nuts, square or hexagon blank, $3.50; and tapped, $3.25 off list.

Coke.—Coke continues in big demand, with the sources of supply continually being made smaller because of the coal and railroad strike. Urgent demand is being made by users for shipments against pur-

chases. The Granite City by-product maker is still holding its production down to the minimum required to supply municipalities depending upon them for gas, while the local by-product plant has been out of the market for some time. The Granite City producer is taking orders for coke, subject to price prevailing when they are able to ship it. No coke is to be had from the South on account of railroad conditions. Some Connellsville coke is being sold on a basis of $15 a ton at the ovens.

Old Material.—The market for old material continues to advance. No scrap is coming in, the railroads not offering anything because of the scarcity of labor required to pick up the material, and consumers are eager to get supplies. Mills are showing considerable anxiety about material they have on back orders with dealers, and in some cases are giving a premium of $1 a ton for anything on which deliveries in ten days to two weeks can be guaranteed. There is a tremendous shortage in the specialty market. Cast scrap in car wheels is in very good demand.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	$17.75 to $18.75
Rails for rerolling	16.75 to 17.25
Steel rails, less than 3 ft	16.75 to 17.25
Relaying rails, standard section	25.00 to 28.00
Cast iron car wheels	19.50 to 20.00
No. 1 heavy railroad melting steel	15.50 to 16.00
No. 1 heavy shoveling steel	14.00 to 14.50
Ordinary shoveling steel	13.75 to 14.25
Frogs, switches and guards, cut apart	15.75 to 16.25
Per Net Ton	
Heavy axle and tire turnings	10.50 to 11.00
Steel angle bars	14.75 to 15.25
Iron car axles	24.00 to 24.50
Steel car axles	17.00 to 17.50
Wrought iron bars and transoms	19.00 to 19.50
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	13.00 to 13.50
Railroad springs	18.00 to 18.50
Steel couplers and knuckles	18.00 to 18.50
Cast iron borings	9.00 to 9.50
No. 1 busheling	12.00 to 12.50
No. 1 railroad cast	17.50 to 18.00
Stove plate and light cast	14.75 to 15.25
Railroad malleable	14.50 to 15.00
Pipes and flues	9.75 to 10.25
Machine shop turnings	9.25 to 9.75

Cincinnati

Pig Iron More Active and Prices Higher—Coke Advances

CINCINNATI, Aug. 15.

Pig Iron.—The market is showing more activity, both as regards inquiry and sales. Last week some fair-sized tonnages were booked, principally for Northern irons, as, with two exceptions, all Southern interests are out of the market for the present. One Southern furnace is quoting $21, Birmingham, for fourth quarter, and another has a small tonnage available for shipment in September, on which it is quoting $24, Birmingham. Northern furnace prices range from $28 to $30, sales having been made at both the minimum and maximum figures. A West Virginia melter bought 1100 tons of foundry and malleable grades at $28 to $30, Ironton basis. A central Ohio melter took 200 tons of malleable at $30, southern Ohio, furnace, and 100 tons of Lake Superior charcoal at $30, furnace. An Indiana melter is understood to have placed 500 tons of malleable with a Chicago district furnace at $28, and another Indiana melter took 200 tons of foundry at the same price. A southern Ohio melter bought 300 tons of foundry at $30, southern Ohio furnace, for fourth quarter. A sale of a round tonnage of basic to a northern Ohio melter is reported to have been made at the equivalent of $26, Valley. A Michigan melter placed an order for approximately 1500 tons of silvery, at a price understood to be around $38, furnace, for the grade purchased. The market on silvery is regarded as nominal, there being little iron under 9 per cent to be had, but it is at least $3.50 higher on grades obtainable. A Hamilton melter is inquiring for 1000 tons for September and October shipment; a Louisville melter for a similar tonnage; a local melter for 500 tons of foundry and 100 tons of Bessemer. Two inquiries from Indiana total 1000 tons. Practically all Southern furnaces are reported to be piling their make, as embargoes have been placed on all open top equipment. Shipments are coming through slowly and the practice of borrowing iron to keep running is being more generally resorted to. Norton Furnace at Ashland, Ky., has been banked on account of the fuel situation.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.05 to $25.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.55 to 25.55
Ohio silvery (nominal), 8 per cent	38.27
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	30.27 to 32.27
Basic Northern	28.27
Malleable	30.27 to 32.27

Plant Operations.—All plants in the Cincinnati district are running at last week's schedule, the rail and coal strikes having caused only slight inconvenience. With the exception of lines serving the South, traffic is moving away from steel mills in good shape, and consumers are suffering little from delayed shipments. Pittsburgh district mills are moving tonnages by the river route to points as far as Louisville, but owing to the low stage of the Ohio, it has been found impossible to send heavily laden barges to points below that city.

Finished Material.—Consumers are more concerned with securing deliveries on contracts than in placing new business, and as a result the market is rather quiet. The only inquiry of consequence comes from a large tank manufacturer, who is in the market for approximately 700 tons of plates. Repair work taken by car manufacturers in this district has also caused a good demand for plates, and a recent inquiry called for approximately 5000 tons. While the ruling price apparently is 1.80c., this is for rather indefinite delivery. A Youngstown mill which recently resumed operations is understood to have booked a heavy tonnage at 2c., and is now contemplating an advance to 2.15c. The demand for sheets has fallen off considerably, as most consumers are covered for third quarter requirements. Speculation is keen as to prices mills will name for fourth quarter, and if the rail and coal strikes continue for an indefinite period, considerably higher prices are looked for. There is a fair demand for steel pipe, coming mostly from jobbers whose stocks are running low. The wire market is fairly active, nails particularly being in good demand. A southern Ohio mill has advanced its prices 10c. a keg, to $2.50 mill. Pittsburgh district mills, which had been equalizing the Ironton rate on nails, have abandoned this practice, and are quoting strictly on an f.o.b. Pittsburgh basis, with rail freight added. There was little activity in the structural field. The Pollak Steel Co. has taken 200 tons of bars for a school building in Cincinnati. A 10-story office building in Cincinnati, permit for which has been secured but no contract let, will take approximately 400 tons of bars. Tank manufacturers report a large number of repair orders, and while they are having no difficulty in securing plates on their contracts, shapes are coming in slowly, and they are forced to depend on local warehouses to take care of rush orders.

Warehouse Business.—Jobbers' stocks are moving in heavy volume as a result of the railroad situation, and some of them report having difficulty in replacing steel. The demand for reinforcing bars and small angles is particularly insistent, with nails and other wire products also moving at a greatly increased rate. Prices are very firm, and it is expected that an advance in nail prices will be made shortly. In the meantime, quotations are unchanged.

Jobbers quote: Iron and steel bars, 2.75c. base; hoops, 3.60c.; bands, 3.35c. base; shapes and plates, 2.85c. base; reinforcing bars, 2.82½c. base; cold-rolled rounds, 3.50c. base; flats, squares and hexagons, 4c. base; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 9 annealed wire, $2.70 per 100 lb.; common wire nails, $2.85 per keg, base.

Coke.—The coke situation is tightening and prices are steadily advancing. Very little coke is available from any district, although by-product producers are shipping steadily on contracts, and coke is moving in slightly better volume. Prices are higher, Connellsville being quoted at $17, New River $15, Pocahontas $14, and Wise County $13. By-product fuel on August con-

mitments remains unchanged at $9, Connellsville basis, but September prices will, it is expected, show an advance of at least $1. A West Virginia steel company is in the market for 5000 tons.

Old Material.—On account of the railroad situation there is little activity in the scrap market. A blast furnace out of the district has sent out an inquiry for approximately 2000 tons of turnings, and this is being worked on. Rolling mill grades are very quiet.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

	Per Gross Ton	
Bundled sheets	$8.00 to	$8.50
Iron rails	13.50 to	14.00
Railroad rails, 50 lb. and up	26.50 to	27.00
Rails for rerolling	13.50 to	14.00
Heavy melting steel	13.00 to	13.50
Steel rails for melting	13.00 to	13.50
Car wheels	14.50 to	15.00
Per Net Ton		
No. 1 railroad wrought	11.50 to	12.00
Cast borings	9.00 to	9.50
Steel turnings	8.00 to	8.50
Railroad cast	14.00 to	14.50
No. 1 machinery	17.00 to	17.50
Burnt scrap	9.50 to	10.00
Iron axles	18.00 to	18.50
Locomotive tires (smooth inside)	11.00 to	11.50
Pipes and flues	6.50 to	7.00

Birmingham

BIRMINGHAM, ALA., Aug. 15.

Pig Iron.—Iron deliveries had grown so difficult so far as north of Nashville is concerned at the close of last week that Alabama makers had begun declining new business for prompt delivery because unable to make promises in that respect. The market might be said to be a $20 one for the usual run of business, but 15,000 to 20,000 tons for third and fourth quarter delivery to pipe concerns brought a base not much above $19. Competitive buying markets reported a base of $19.50 to $21 for Birmingham iron last week. Some lots are known to have brought over $20, but one large maker was quoting $19.50 to $20 on competitive business. But for the large consumption in the Birmingham district, several blast furnaces would probably have banked by this time, but this consumption remains at an unprecedented level and, delivery being a matter of switching, yard stocks are not piling iron as would otherwise be the case. However, the car shortage for delivery purposes out of the district is more and more acute and, if the rail strike lasts much longer, there will be some decrease in production. For the present, that has not been curtailed either at blast furnaces or at consuming plants. Pressure pipe plants are turning out more tonnage than in their history and in that quarter deliveries are fairly satisfactory so far as the South and Southeast are concerned. The blast furnace of the Central Coal & Iron Co. did not blow in last week as was expected. It was decided to wait on a less embarrassing car situation. Stocks of iron of the Sloss-Sheffield Steel & Iron Co., at Providence, R. I., which were piled two years ago, are understood to be dwindling with base of $20 being obtained from New England consumers. The 22 active furnaces on the first of the month are still active. All makers are piling some iron.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$19.50 to	$20.00
Basic	18.50 to	19.00
Charcoal, warm blast	30.00 to	32.00

Finishing Mills.—There has been no curtailment of production at finishing mills, although complaint of the car shortage for deliveries is growing. The Tennessee company continued double turn this week at Bessemer, Fairfield and Ensley mills with 100 per cent ingot production. The American Steel & Wire Co., the Gulf States Steel Co. and the Conners Steel Co. maintain undiminished production in finishing mills. Structural steel works are very busy.

Cast Iron Pipe.—There has not been much new business in the pipe market, but all plants labor under an accumulation of orders. The high pressure base remains at $37 and that of sanitary pipe at $60 with some sales at $65. The pipe melt is the largest on record.

Coal and Coke.—Alabama's coal production is the largest on record, having reached 405,000 tons a week. Western railroads furnish a large supply of cars for the extra demand in that quarter. All industries so far are getting the coal required for operation. Spot coal is easily selling for $4, sometimes more. Coke is in very strong demand with spot base very close to $7. Still higher prices have been obtained. The production is at a maximum.

Old Material.—The old material market is steady and the quoted prices are brought in actual transactions. No. 1 cast is up $1 and larger quantities are leaving yards than in some time.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$13.00 to	$15.00
No. 1 steel	16.00 to	17.00
No. 1 cast	15.00 to	16.00
Car wheels	15.00 to	16.00
Tramcar wheels	14.00 to	15.00
Stove plate	13.00 to	14.00
Cast iron borings	6.00 to	7.00
Machine shop turnings	4.00 to	5.00

Boston

BOSTON, Aug. 15.

Pig Iron.—Buffalo and western and eastern Pennsylvania furnace shipments of iron into this territory are backward. The demand for spot iron, therefore, is more active. Some foundries with more No. 2X and No. 1X than wanted have resold to other foundries, but the supply of such iron is limited. Buyers are forced to take Alabama or foreign iron if round tonnages are wanted. Sales of Alabama for the past week aggregate 1500 tons, mostly No. 2X and No. 1X, for August and September delivery at $30 dock Providence, R. I., base, and for fourth quarter at $20 furnace base. Sales of foreign again totaled 5000 to 6000 tons, mostly Scotch, for August and September arrival. Buying for last quarter has diminished. The largest individual sale was 1500 tons Scotch equal to our No. 2X and No. 1X, to a Massachusetts melter, August shipment. Foreign irons are higher. Scotch, the past week, sold at $28 to $32 dock here, English at $28 to $30, Belgian at about the same price, and French at $27 to $29. On Saturday last, 1000 tons Middlesboro, Eng., iron arrived on order at this port. This lot originally was shipped in July, but the steamer was forced to return to port for repairs. Other lots of English, as well as of Scotch, are due to arrive within the next ten days or two weeks. A small tonnage of Scotch, August delivery, is offered at $29.50, dock Bridgeport, Conn. Inquiries in the market aggregate several thousand tons. Business in foreign iron has been hampered by serious delays in cable service. A special sale of 150 tons of Buffalo, silicon 3.25 to 3.75, October-November shipment, at $31 furnace, is reported, which figures out about $29 furnace base.

We quote delivered prices, on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

East. Penn., sil. 2.25 to 2.75	$32.15 to	$34.15
East. Penn., sil. 1.75 to 2.25	31.65 to	33.65
Buffalo, sil. 2.25 to 2.75	30.41 to	31.41
Buffalo, sil. 1.75 to 2.25	29.91 to	30.91
Alabama, sil. 2.25 to 2.75	29.60 to	30.10
Alabama, sil. 1.75 to 2.25	29.10 to	29.60

Warehouse Business.—Warehouse prices on iron and steel are very firm. Some interests are getting 3c. per lb. for merchant bars and slightly better for concrete bars, the latter being in comparatively short supply. A majority of warehouses, however, are on a basis of $2.75½ for merchant bars, stocks of which are in fairly good condition. The supply of steel bands is shortening, and prices for same are stiff. The general movement of iron and steel out of warehouses holds up well, being better than at any previous period this year. Bolts and nuts are moving in reasonable quantities and prices are firm. Nails and rivets are in fair demand. Cap and set screws are up 5 per cent at 65 and 5 per cent discount.

Jobbers quote: Soft steel bars, $2.75½ per 100 lb. base; flats, $3.40½; concrete bars, $2.90 to $3.03; structural steel, $2.75½ to $2.90½; tire steel, $4.15 to $4.50; open-hearth spring steel, $4.50 to $6; crucible spring steel, $11.50; steel bands, $3.90; hoop steel, $4.40; cold rolled steel, $3.50 to $4; refined iron, $2.75½; best refined iron, $4.25; Wayne iron, $5.50; Norway iron, $6 to $6.50; plates, $2.85½ to $3.04; No. 10 blue annealed sheets, $3.90 per 100 lb. base; No. 28 black sheets, $4.90; No. 28 galvanized sheets, $5.90.

Finished Material.—New England producers of iron and steel by-products, generally speaking, are less concerned over coal than they are over metal supplies. This territory is so located geographically it can easily draw on British and Dominion coals in a pinch. Consumption of electric power and fuel oil is on the increase, especially at inland industrial centers like Worcester and Springfield, Mass. New England bolt and nut makers report trouble in getting steel. Buffalo and Pennsylvania mills still refrain from taking on new business except at unspecified deliveries. Structural steel bookings are largely confined to small tonnages. Bids closed yesterday on 7200 lb. chrome alloy steel for barrels of machine rifles to be made at the Springfield, Mass., arsenal.

Coke.—Several thousand tons of English foundry coke are reported sold in this territory. One melter took 1500 tons for delivery during the next six to eight weeks. Prices for this fuel figure out slightly higher than New England by-product delivered within the $3.10 local freight points. The first cargo of English coke for Boston sailed Aug. 12. A second will shortly follow. Both the New England Coal & Coke Co. and the Providence Gas Co. are still quoting by-product foundry coke to apply to contracts at $16.50 delivered where the local freight does not exceed $3.10 a ton. They are not in the markekt for spot business. Crushed coke has been advanced another $2 a ton to $16 ovens. The producers, due to the scarcity of certain grades of coking coals, are unable to make deliveries as promptly as desired by the foundry trade.

Old Material.—New business the past week was limited to a few hundred tons of borings and turnings and miscellaneous material like horseshoes, shafting, etc., at unchanged prices. Round tonnages of cast iron borings are wanted, but material is lacking. A moderate tonnage of heavy melting steel, borings, turnings and bundled skeleton was shipped from this territory to Pennsylvania on old contracts.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plate	15.50 to 16.50
Railroad malleable	15.00 to 15.50
Street car wheels	18.00 to 19.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.00 to $11.50
No. 1 railroad wrought	11.50 to 12.00
No. 1 yard wrought	10.00 to 10.50
Wrought pipe (1 in. in diam., over 2 ft. long)	8.00 to 8.50
Machine shop turnings	9.00 to 9.50
Cast iron borings, rolling mill	9.50 to 10.00
Cast iron borings, chemical	12.00 to 12.50
Blast furnace borings and turnings	9.00 to 9.50
Forged scrap and bundled skeleton	8.00 to 8.50
Street car axles and shafting	14.50 to 15.00
Rails for rerolling	11.00 to 11.50

Philadelphia

Coke Shortage Causes Further Curtailment of Pig Iron Production—Prices Higher

PHILADELPHIA, Aug. 15.—Coal and coke shortage has caused further curtailment of pig iron production in the Eastern district. Fuel oil is saving the situation to some extent in the manufacture of steel, but as the pig iron shortage grows more acute, it will, of course, have its effect upon steel rollings, which up to this time have not suffered greatly. The Bethlehem Steel Co. now has only five of its 12 active furnaces in blast, three at Bethlehem, one at Steelton and one at Sparrows Point. Three furnaces at Bethlehem and two each at Steelton and Sparrows Point are banked. The Cambria Steel Co. on Sunday banked two additional furnaces at Johnstown, making three that are banked there, with two active. The Adrian furnace at Dubois, Pa., which was making merchant iron, went out of blast last Friday and the Warwick stack at Pottstown, which has been banked for more than two weeks, will probably be blown out this week. The Alan Wood Iron & Steel Co. has let its No. 3 furnace, the largest of its three stacks, go out of blast because of the fact that the Rainey-Wood Coke Co., from which it obtains by-product coke, has been called upon by the American Gas Association to furnish more coke to gas plants. The two active furnaces of the Alan Wood Iron & Steel Co. are making basic.

There is now an acute shortage of both pig iron and steel, so far as the ability of mills and furnaces to accept business is concerned, though this shortage has not seriously affected consumers in general as yet, many of them having stocks on hand. When a consumer is obliged to come into the market, it is now difficult, however, to obtain promise of early shipment of either pig iron or steel. The foundry pig iron situation is relieved to a certain extent by continued importations of foreign iron.

Meanwhile prices are rising,, bars, shapes and plates fetching from 2c. to 2.25c., Pittsburgh, according to the needs of the buyer and the attitude of the seller. Foundry pig iron is well above $30 for the higher silicon grades, either domestic or imported.

The iron and steel industry does not see much hope for early amelioration of its difficulties, even though the partial settlement of the bituminous coal strike at Cleveland should increase coal production speedily. It is believed that it will be at least 30 to 60 days before there is any appreciable relief in the coal and coke shortage. If steel companies which have their own non-union coal mines are obliged to pay practically the union scale to obtain miners, this would bring about an additional cost of 50c. to 60c. per ton for their coal. The scarcity of common labor at steel plants, already acutely felt at some points, is bound to become a more restrictive factor when the industry is operating at a fuller rate.

Pig Iron.—The banking of more blast furnaces, due to lack of coke, has created a more serious shortage of domestic pig iron, which is being relieved to some extent by continued importations of foreign iron. The cutting down of the Bethlehem Steel Co.'s active stacks from 12 to five has left that company in a position where it cannot take care of its merchant trade, while the banking of the Alan Wood Iron & Steel Co.'s No. 3 furnace leaves that interest without any foundry iron, the other two furnaces being on basic. The blowing out of the Adrian furnace, which is in the western Pennsylvania group, removes another source of merchant iron, considerable of its product having been shipped recently into this district. The Warwick furnace, which has been banked, will probably be blown out this week with considerable unshipped business on its books. The Wharton furnace of the Replogle Steel Co., Wharton, N. J., and the Brooke furnace are the only stacks now making foundry iron and these are selling in a very limited way at about $31 for No. 2 plain and $32 for No. 2X, f.o.b. furnace. Some consumers who have been getting sufficient domestic iron for their immediate needs are now turning to foreign iron as a protection against a possible shortage and sales of the latter are growing. A pig iron sales company with offices in Philadelphia, New York and Boston has bought about 25,000 to 30,000 tons of British and Continental iron, most of which is on the way and has been contracted for by melters. Scotch iron, 2.25 to 2.75 per cent silicon, is quoted at $31, c.i.f. Philadelphia, with higher silicon grades held at $33 to $34; English iron of standard phosphorus content is quoted at $28, c.i.f. Philadelphia, with higher phosphorus grades $1 a ton less, and Continental iron, in which the phosphorus runs from 0.80 to 1.75 per cent, is being sold at $26.50 to $27, c.i.f. Philadelphia. The buyer agrees to pay any duty that may be levied under the tariff bill now before Congress. There is a renewed demand for steel-making iron. A Pennsylvania plate manufacturer and a structural subsidiary of the Steel Corporation are in the market for a total of 10,000 to 20,000 tons of basic for early delivery, but furnaces are loath to quote. The Standard Steel Works Co. has bought 2000 tons or more of copper bearing low phosphorus iron at about $33, furnace, and the last of the copper free low phosphorus iron in the East, 4000 tons, which was in stock at a New York State furnace, has been sold to a Worcester, Mass., wire manufacturer at slightly under $35, furnace. An eastern Pennsylvania furnace making copper bearing low phosphorus iron last week sold about 4000 tons, a part of which brought $35, furnace, and it

is now quoting $40. A competing furnace is holding its price at $35. One of the important producers of eastern Pennsylvania foundry iron has opened its books for fourth quarter at $30 for No. 2 plain, $31 for No. 2X and $32 for No. 1X, f.o.b. furnace. The most important sale of domestic foundry iron the past week was to the Pennsylvania Railroad, covering its second half requirements, the amount being about 7000 tons. The business was taken by a western Pennsylvania furnace, but the price was not disclosed. Prices quoted below on basic, gray forge and malleable grades are nominal and do not represent the levels that consumers would now be obliged to pay.

The following quotations are, with the exception of those on phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 76 cents to $1.64 per gross ton.

East Pa. No. 2 plain, 1.75 to 2.25 sil.	$32.14 to	$32.64
East Pa. No. 2X, 2.25 to 2.75	33.14 to	33.64
East Pa. No. 1X		34.64
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.17 to	30.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.17 to	31.17
Basic, delivery eastern Pa.	26.75 to	27.25
Gray forge	29.50 to	31.50
Malleable	29.00 to	30.00
Standard low phos. (f.o.b. furnace)		35.00
Copper bearing low phos. (f.o.b. furnace)	35.00 to	40.00

Ferroalloys.—There has been no change in the price of British ferromanganese, which remains at $67.50, Atlantic seaboard, but none is available for early shipment. Spot cars of ferromanganese, mostly resale material, have brought $75 and $80 per ton.

Semi-Finished Steel.—Very little semi-finished steel is being sold, but when quoted, it is usually on a basis of about $37.50, Pittsburgh, for rerolling quality and $42.50, Pittsburgh, for forging quality, some mills asking even higher prices.

Plates.—From the weakest of the heavy steel products, a few months ago, plates have become the strongest and prices above 2c., base, Pittsburgh, are obtainable when mills can promise early deliveries. The withdrawal of Pittsburgh, Youngstown and Chicago mills from the market has brought a large demand from the Central West to the few mills in the East that are accepting orders. The Lukens Steel Co., with three months business on its books, has attempted to withdraw from the market and has advanced its price to 2.25c., Pittsburgh. Another Eastern mill continues to sell at 2c., Pittsburgh, and this is to-day the minimum at which plates are to be had for early delivery. A Youngstown steel company started one of its plate mills to-day and is offering small lots to its regular customers at 2c., Pittsburgh, for desirable rollings and at 2.25c. for less desirable specifications. Many customers of the leading interest, unable to obtain deliveries, are turning to the independent mills. Instances of consumers paying $6 to $8 a ton more for plates than their contracts call for with other mills are frequent. The Union Pacific Railroad is inquiring for 65 locomotives and there are inquiries from two other roads totaling 30 engines. The Coatesville mills of the Midvale Steel & Ordnance Co. are rolling plates for about 100 engines recently booked by the Baldwin Locomotive Works. The Pennsylvania Railroad last week inquired for about 13,000 tons additional car repair steel, but is reported to have had difficulty placing all of the business. We quote sheared plates, ¼ in. and heavier, at 2c., Pittsburgh.

Structural Material.—Though occasional attractive lots of plain material have been sold by one producer at 1.95c., Pittsburgh, the current market for early delivery is more nearly 2c., while for 24-in. and other heavy beams buyers will pay 2.25c., Pittsburgh. There is a good demand, particularly from fabricators who are not getting deliveries as expected from their regular sources of supply.

Bars.—Steel bars are unobtainable except from one source at less than 2c., Pittsburgh. This one producer is selling a very little soft steel at 1.90c., Pittsburgh, most of its bars being for drop forging work. Bar iron makers have advanced their quotations to 2c., Pittsburgh, for carloads. While bar iron is fairly plentiful and is being substituted by some consumers for steel bars, the quantity of steel bars to be had is very limited. Few steel bar mills are taking business at any price.

Sheets.—There is a good demand for sheets, with mills quoting 2.50c. to 2.60c. for blue annealed; 3.30c. to 3.40c. for black and 4.30c. to 4.40c. for galvanized, all base Pittsburgh.

Wire Products.—Wire nails have been advanced to $2.60 and plain wire to $2.35 per 100 lb. by a Pittsburgh independent, an advance of $2 a ton.

Warehouse Business.—Prices for steel out of stock have been advanced $2 or more a ton, the new quotations going into effect to-day. We now quote for local delivery as follows:

Soft steel bars and small shapes, 2.80c.; iron bars (except bands), 2.80c.; round edge iron, 3c.; round edge steel, iron finish, 1½ x ½ in., 3c.; round edge steel planished, 3.75c.; tank steel plates, ¼-in. and heavier, 2.90c.; tank steel plates, ⅜-in., 3.10c.; blue annealed steel sheets, No. 10 gage, 3.50c.; black sheets, No. 28 gage, 4.30c.; galvanized sheets, No. 28 gage, 5.40c.; square twisted and deformed steel bars, 2.90c.; structural shapes, 2.90c.; diamond pattern plates, ¼-in., 4.80c.; ⅜-in., 5c.; spring steel, 3.50c.; round cold-rolled steel, 3.35c.; squares and hexagons, cold-rolled steel, 3.70c.; steel hoops, No. 13 gage and lighter, 4c.; steel bands, No. 12 gage to ⅜-in., inclusive, 3.45c.; rails, 2.80c.; tool steel, 8c.; Norway iron, 5.50c.

Manganese Ore.—About 3000 tons of Brazilian manganese ore, imported by a New York broker, is reported to have been sold to a Pittsburgh steel company at 29c. per unit, Baltimore.

Coke.—Ten cars of blast furnace coke were sold yesterday at $14.50, Connellsville. Foundry coke, when obtainable, is being sold at $15.50 to $15.75, Connellsville. A cargo of about 5000 tons of British by-product coke is on the way and all except about 1000 tons has been sold to gas plants at prices ranging from $14 to $15 c.i.f. Philadelphia.

Old Material.—The shortage of pig iron has created a better demand for scrap and prices have strengthened. Heavy melting steel has been sold within the past few days at $15, Nicetown, and $15.50, Claymont and Bethlehem, but it is doubtful if the lower price could be duplicated. Scrap brokers are holding for $15.50 to $16. Railroad and yard wrought, cast borings, No. 1 cast, stove plate, railroad grate bars and wrought iron and soft steel pipe are all at least 50c. a ton higher than a week ago. Blast furnace borings and turnings are firm, but not in much demand, owing to the wholesale banking of blast furnaces. We now quote for delivery at consumers' works in this district as follows:

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$15.00 to	$15.50
Scrap rails	15.00 to	15.50
Steel rails, rerolling	17.00 to	17.50
No. 1 low phos., heavy 0.04 and under	22.00 to	24.00
Cast iron car wheels	17.50 to	18.50
No. 1 railroad wrought	18.00 to	18.50
No. 1 yard wrought	15.50 to	16.50
No. 1 forge fire	13.00 to	13.50
Bundled sheets (for steel works)	13.00 to	13.50
No. 1 busheling	12.50 to	13.00
No. 2 busheling	10.00 to	11.00
Turnings (short shoveling grade for blast furnace use)	13.00 to	13.50
Mixed borings and turnings (for blast furnace use)	13.00 to	13.50
Machine-shop turnings (for steel works use)	13.00 to	13.50
Machine-shop turnings (for rolling mill use)	13.50 to	14.00
Heavy axle turnings (or equivalent)	14.00 to	14.50
Cast borings (for steel works and rolling mills)	14.50 to	15.00
Cast borings (for chemical plants)	17.00 to	17.50
No. 1 cast	19.00 to	20.00
Railroad grate bars	15.50 to	16.00
Stove plate (for steel plant use)	15.00 to	16.00
Railroad malleable	15.00 to	15.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.50 to	14.00
Shafting	21.00 to	22.00

Youngstown Takes More Hopeful View

YOUNGSTOWN, Aug. 15.—Youngstown iron and steel interests take a more hopeful view of the industrial coal outlook following the agreement in Cleveland between large operators and union miners. The action is also expected to have important bearing on non-union field operations. It is expected that non-subscribers in the Connellsville district, from which the bulk of the coal supply for Valley industries ordinarily comes, will gradually get back into production. Owing to the agreement, steel executives now see a possibility of averting important plant suspensions scheduled for the next two weeks under the present fuel supply.

Cleveland

Little Early Relief Expected from Partial Settlement of Coal Strike

CLEVELAND, Aug. 15.—The steel industry looks for little immediate relief from the partial settlement of the coal strike in the bituminous fields. Not much improvement in the situation is expected until the railroad strike is settled. A strike of the trainmen on the Louisville & Nashville Railroad Monday will probably tie up shipments of coal over that road from the non-union fields of Kentucky, on which Cleveland and several Valley mills are depending for fuel supply, and will make the fuel situation more acute. Transportation facilities on other roads bringing Kentucky coal to Cincinnati for Ohio steel plants are badly crippled and these apparently cannot increase their present limited coal shipments. Two furnaces were added to the idle list during the week. The American Steel & Wire Co. banked a Central furnace, leaving two in blast, and the Perry furnace at Erie went out. The Bourne-Fuller Co. is considering shutting down its steel plant as soon as its present pig iron supply is exhausted.

Semi-Finished Steel.—Considerable inquiry is coming out for round lots of sheet bars, slabs and billets for the fourth quarter, indicating that consumers are figuring on consuming semi-finished steel at about the same rate during that period as they have for the past few months. However, the leading local producer has not yet named the fourth quarter prices. The market is regarded as around $40.

Iron Ore.—Shipping conditions at the head of the lakes show further improvement. The Great Northern Railroad, which apparently has been the most seriously affected by the shopmen's strike, is now moving ore to Superior at about 90 per cent of normal. Shippers are still experiencing difficulty in moving ore over the Northwestern Railroad, particularly to Escanaba. At the lower end of the lakes the only difficulty reported is in shipments to southern Ohio points, cars not being available for ore because of the priority orders for the movement of coal. On Aug. 1 there was 7,396,842 gross tons of ore on Lake Erie docks as compared with 8,840,824 tons on the corresponding date last year. July receipts at Lake Erie docks were 6,646,679 tons as compared with 2,793,955 tons during the same month last year. Receipts at Lake Erie ports for the season until Aug. 1 were 11,949,884 tons as compared with 7,249,435 tons during the same period of 1921.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Coke.—Car lot sales of Connellsville foundry coke are reported at $15, but both the demand and supply are very light. Wise County foundry coke is quoted at $12 to $12.50 and New River coke at $15.

Pig Iron.—The Perry furnace of Pickands, Mather & Co., Erie, Pa., was blown out Sunday because of the fuel shortage and there is an increasing evidence of the scarcity of all grades of pig iron. However, demand is light, indicating that most foundries are supplied for their immediate requirements and prices have not been further advanced. In anticipation of their requirements, foundries sent in shipping orders a few weeks ago and some producers report that they are not being crowded for deliveries as much as they were last month. The only northern Ohio iron that is now available is being made by a local producer. This interest is so well sold up that it is taking orders only from consumers that are in urgent need of iron and report several sales ranging from car lots up to a few hundred tons. These sales were made at $30. Sales of small lots of Buffalo iron are reported at $31 for shipment to Valley points. There is no activity in basic iron, but it is doubtful whether this grade could be purchased below $27. Low phosphorus iron is fairly active, but is becoming very scarce and is firm at $35. We note the sale of 400 tons at that price to a Pittsburgh district consumer. Small resale lots of Ohio silvery iron have sold at the regular price of $32.50. Although there is a shortage of this grade the price on Ohio silvery iron has not been advanced since May.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 50c. switching charge. Other quotations except basic and low phosphorus are delivered Cleveland, being based on a $3.02 rate from Jackson and a $6 rate from Birmingham:

Basic, Valley furnace	$27.00
Northern No. 2 fdy., sil. 1.75 to 2.25	30.00
Southern fdy., sil. 1.75 to 2.25	26.50
Malleable	30.00
Ohio silvery, sil. 8 per cent	36.00
Standard low phos., Valley furnace	$35.00 to $36.00

Finished Iron and Steel.—Mills are getting considerable inquiry for steel from consumers who are either unable to secure deliveries from or place orders with their regular sources of supply. With a number of producers entirely out of the market and deliveries getting further behind, consumers are finding it increasingly difficult to buy steel, and mills that can promise fairly early shipments have further advanced prices. About 8000 tons of plates for oil tank work are pending. The placing of this work seems to have been delayed because of the trouble tank shops are having in finding mills that can supply plates in time to meet the requirements of the oil companies. The Brier Hill Steel Co. started up its 132-in. plate mill to-day and can still promise early delivery. The minimum price on steel bars, plates and structural material is 1.80c., for indefinite delivery, but 2c. is the more general quotation, and higher prices are prevailing for early shipment. One Valley mill during the week advanced its price on plates from 2c. to 2.25c. for early shipment and some small producers are quoting as high as 2.50c. Some fabricators have advanced their quotations on structural work from $5 to $12 a ton owing to the advancing cost of steel. It is understood that approximately 2000 tons of structural material for additions to the Lima Locomotive plant was placed with an Eastern mill at 2c., and 350 tons of plates for the same job with a Valley mill at the same price. The Otis Steel Co. has sent out an inquiry for bids for its new steel plant requiring 9000 tons of structural material.

Jobbers quote steel bars, 2.66c.; plates and structural shapes, 2.76c.; No. 9 galvanized wire, 3c.; No. 9 annealed wire, 2.50c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.50c. to 3.61c.; hoops and bands, 3.31c.; cold-rolled rounds, 3.45c.; flats, squares and hexagons, 3.95c.

Old Material.—The McKinney Steel Co. has commenced to take shipments of heavy melting steel on contracts for round tonnages placed two years ago. Deliveries on this were held up when the company's plant was shut down. This scrap was purchased at various prices, some of it as high as $30 per ton. Price adjustments are being made with dealers having contracts for this scrap. It is claimed that these dealers either have the scrap in their yards or purchased and the releasing of the scrap by the consumer is not expected to stimulate buying. However, it is believed that the cleaning up of these contracts will have a stiffening effect on the market. The market continues dull but firm. Some consumers have held up shipments owing to curtailment of operations. Sales are reported by a local producer of 1500 tons of heavy melting steel scrap at $16.25 and 300 tons of shoveling turnings at $13.25, but these prices are somewhat above the usual market quotations.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$15.00 to $15.25
Steel rails, under 3 ft	15.25 to 15.50
Rails for rolling	15.75 to 16.25
Iron rails	14.00 to 15.00
Iron car axles	18.00 to 19.00
Low phosphorus melting	16.00 to 16.25
Cast borings	12.00 to 12.25
Machine shop turnings	12.00 to 12.25
Mixed borings and short turnings	12.00 to 12.25
Compressed steel	12.85 to 13.25
Railroad wrought	14.00 to 14.50
Railroad malleable	15.50 to 16.00
Light bundled sheet stampings	10.00 to 10.25
Steel axle turnings	13.00 to 13.50
No. 1 cast	17.00 to 17.50
No. 1 busheling	10.25 to 10.50
Drop forge flashings over 10 in.	10.25 to 10.50
Drop forge flashings under 10 in.	10.00 to 10.50
Railroad grate bars	13.75 to 14.25
Stove plate	13.75 to 14.25
Pipes and flues	10.00 to 11.00

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Shearing, gunk quality, base, per lb.....1.80c. to 2.00c.

Structural Material

Beams, channels, etc.....1.80c. to 2.00c.

Iron and Steel Bars

Soft steel bars, base, per lb.....1.80c. to 2.00c.
Refined iron bars, base, per lb.....2.25c.

Hot-Rolled Flats

Hoops, base, per lb. .....2.50c. to 2.75c.
Bands, base, per lb. .....2.50c. to 2.75c.
Strips, base, per lb.....2.50c. to 2.75c.
Cotton ties, per bundle of 45 lb.....$1.11

Cold-Finished Steels

Bars and shafting, base, per lb.....2.25c.
Strips, base, per lb. .....4.00c.

Wire Products

Nails, base, per keg.....$2.40 to $2.60
Bright plain wire, base, per 100 lb..... 2.25 to 2.35
Annealed fence wire, base, per 100 lb..... 2.25 to 2.35
Galvanized wire, base, per 100 lb..... 2.75 to 2.85
Galvanized barbed, base, per 100 lb. ..... 3.05 to 3.15
Galvanized staples, base, per keg ..... 3.05 to 3.15
Painted barbed wire, base, per 100 lb. ..... 2.55 to 2.65
Polished staples, base, per keg ..... 2.55 to 2.65
Cement coated nails, base, per count keg.....1.90c. to 2.10c.
Woven fence, carloads (to jobbers).....73 per cent off list
Woven fence, carloads (to retailers)....70½ per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads,
60, 10 and 10 per cent off list
Machine bolts, small, cut threads....60 and 10 per cent off list
Machine bolts, larger and longer.....60 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads.60 and 10 per cent off list
Cut threads .....60 per cent off list
Longer and larger sizes .....60 per cent off list
Lag bolts .....60, 10 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....50 and 10 per cent off list
Larger and longer sizes .....50 and 10 per cent off list
Hot pressed square or hex. blank nuts .....$4.50 off list
Hot pressed nuts, tapped .....$4.50 off list
C.p.c. and t. sq. or hex. nuts, blank .....$4.50 off list
C.p.c. and t. sq. or hex. nuts, tapped .....$4.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S.....80 and 10 per cent off list
⅝ in. and larger, U. S. S...75 and 10 per cent off list
Small sizes, S. A. E. .....80, 10 and 10 per cent off list
S. A. E. ⅝ in. and larger..75 and 10 and 10 per cent off list
Stove bolts in packages .....80 and 5 per cent off list
Stove bolts in bulk .....80, 5 and 2½ per cent off list
Tire bolts .....65 per cent off list
Track bolts in carloads.....3.25c. to 3.50c. base
Track bolts, less than 200 kegs.....4.25c. to 4.50c. base

Cap and Set Screws

Milled square and hex. head cap screws,
75 and 10 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws .....80 per cent off list
Upset set screws .....80 and 5 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb.....$2.65
Large boiler rivets, base, per 100 lb..... 2.75
Small rivets .....70 to 70 and 5 per cent off list

Track Equipment

Spikes, ⅜ in. and larger, base, per 100 lb.....$2.35 to $2.50
Spikes, ⅜ in. and smaller, base, per 100 lb..... 2.75 to 3.00
Spikes, boat and barge, base, per 100 lb..... 2.75 to 3.00
Track bolts, base, per 100 lb..... 3.25 to 3.50
Tie plates, per 100 lb. ..... 2.00 to 2.25
Angle bars, base, per 100 lb. 2.40

Welded Pipe

Butt Weld

Steel Inches	Black	Galv.	*Iron* Inches	Black	Galv.
⅛	54½	28	¼ to ⅜.....	+ 3½	+22½
¼ to ⅜.....	60	33½	½	36½	18½
½	65	50½	⅝	42½	27½
¾	69	56½	1 to 1½.....	44½	29½
1 to 3.....	71	58½			

Lap Weld

2	64	51½	2	39½	25½
2½ to 6.....	68	55½	2½ to 6.....	42½	29½
7 to 8.....	65	51½	7 to 12.....	40½	27½
9 to 12.....	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜.....	+ 4½	+37½
¼ to ⅜.....	56	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½.....	44½	30½
1 to 1½.....	69	57½			
2 to 3.....	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4.....	66	54½	2½ to 4.....	43½	31½
4½ to 6.....	65	53½	4½ to 6.....	42½	30½
7 to 8.....	61	47½	7 to 8.....	35½	23½
9 to 12.....	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.....	41	1¾ to 1⅞ in.....	15
2½ to 3 in.....	52	2 to 2¼ in.....	25
3¼ to 13 in.....	57	2½ to 3 in.....	30
		3¼ to 4½ in.....	32

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn or hot-rolled tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	60	2½ and 2¾ in.....	43
1¼ and 1½ in.....	52	3 in.	47
1¾ in.	36	3¼ to 4 in.....	52
2 and 2¼ in.....	39	4¼ in. to 5 in.....	44

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C.....$14.25	
8-lb. coating I. C.....	9.60	30-lb. coating I. C.....	15.25
15-lb. coating I. C.....	11.80	35-lb. coating I. C.....	16.25
20-lb. coating I. C.....	13.00	40-lb. coating I. C.....	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.40c. to 2.60c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.15c. to 3.40c.

Galvanized

No. 28 (base), per lb.....4.15c. to 4.40c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.15c. to 3.40c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export	0.265	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic	0.315	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)	0.705
Baltimore, export	0.255	Detroit	0.295	St. Paul	0.595
New York, domestic	0.34	Cincinnati	0.295	Omaha	0.735
New York, export	0.285	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic	0.365	Chicago	0.34	Denver	1.275
Boston, export	0.285			Denver (pipe)	1.215

Pacific Coast	$1.50	Jacksonville, all rail	0.50
Pac. Coast, ship plates	1.20	Jacksonville, rail and water	0.415
Birmingham	0.69	New Orleans	0.515
Memphis	0.385		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha, and Denver the minimum carload is 40,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope, cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe, not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Aug.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
9.....	14.12½	13.75	32.12½	5.85	5.52½	6.65	6.30
10.....	14.12½	13.75	32.12½	5.87½	5.52½	6.60	6.25
11.....	14.12½	13.75	32.00	5.87½	5.52½	6.55	6.20
12.....	14.12½	13.75	32.12½	5.87½	5.52½	6.55	6.20
14.....	14.12½	13.75	32.12½	5.90	5.55	6.52½	6.17½
15.....	14.12½	13.75	32.12½	5.90	5.55	6.50	6.15

*Refinery quotation.

New York

NEW YORK, Aug. 15.

The markets are only moderately active, due to midsummer dullness and also to the effect of the strikes. Domestic buying of copper continues in fair volume with prices steady. The tin market is only moderately active. Demand for lead is not quite as heavy, but the market is stronger. A reaction in the zinc market has resulted in lower prices.

Copper.—The price situation in the electrolytic copper market continues unchanged and firm at 14c., delivered, or 13.75c., refinery, for delivery through October, with 14.12½c., delivered, or 13.87½c., refinery, for last quarter, with sales for domestic consumption in fairly good volume for both positions. There is some inquiry for first quarter. Several days ago there was some slackening in demand, due to industrial conditions, but in the last day or two business has increased both for domestic and foreign consumption. Lake copper continues firm at 14.12½c., delivered.

Tin.—Until toward the end of last week, when interruption of cable service became serious, the market for Straits tin had been dull and uninteresting, with business confined to light sales of spot and future delivery. Last Friday, however, Aug. 10, due to the cable difficulties, buyers became more anxious and came into the market and, as a result, fair sales were made, mostly to consumers, the total being close to 250 tons. The larger part of these sales were spot delivery, with some October shipment from the East, all at around 32c. Late in the same day there were offerings at 32.12½c., with buyers at 32.10c. Because of the cable situation business was done on Saturday, Aug. 12, in good volume with buyers at 32c. Yesterday about 250 to 300 tons of spot and nearby shipment changed hands at 32.12½c. for the former and 32.25c. for the later position. The market to-day has been very quiet, with quotation at 32.12½c., New York, for spot Straits. Quotations in the London market to-day were about £1½ per ton less than a week ago, with spot standard quoted at £159, future standard at £159 2s. 6d. and spot Straits at £160. Arrivals thus far this month have been 2050 tons with the quantity afloat reported as 4175 tons.

Lead.—This market continues very firm, with the volume of business not quite as heavy as in the last two or three weeks, but demand continues good and specifications on contract show no let-up. Prices in the outside market have been hardening until quotations have reached a level of 5.90c., New York, or 5.55c., St. Louis, but there has been no change in the asking price of the leading interest which continues at 5.75c., New York, and 5.55c., St. Louis.

Zinc.—About the middle of last week a slight reaction set in in this market with a distinct easing in prices; the issuing of statistics for July of the American Zinc Institute has caused this tendency to accelerate. These data showed a reduction in stocks for July smaller than had been generally expected and they also revealed an increase in the number of retorts in operation, amounting to 2322. These facts, coupled with the necessary decrease in consumption due to the strike, have had some effect upon the market. The production for July was 31,917 tons, or 3370 tons more than June, and the shipments are returned as 32,875 tons, or 6505 tons less than June. The surplus stocks at the end of July were 28,618 tons. The fact is pointed to, however, that the reserve stocks are less than a month's consumption, which has averaged about 32,000 tons thus far this year. Prime Western for early delivery is quoted and has sold at 6.15c., St. Louis, or 6.50c., New York, which we quote as the market, a decline of 15 points in the week. Demand, however, is fairly good.

Antimony.—The market is quiet and wholesale lots for early delivery are quoted unchanged at 5.25c. per lb., duty paid, New York.

Aluminum.—Wholesale lots of virgin metal, 98 to 99 per cent pure, are still obtainable from the leading interest at 19.10c. per lb., f.o.b. plant, for early delivery, while the same grade of foreign metal, imported by dealers, is offered at 17.75c. to 18c. per lb., New York, duty paid.

Old Metals.—Business has been fairly active this week and the market has been firm. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.50
Copper, heavy and wire	12.75
Copper, light and bottoms	11.25
Heavy machine composition	10.50
Brass, heavy	8.25
Brass, light	6.50
No. 1 red brass or composition turnings	9.00
No. 1 yellow rod brass turnings	7.50
Lead, heavy	5.00
Lead, tea	4.00
Zinc	3.75

Chicago

AUG. 15.—Some zinc users fearing a car shortage have shown anxiety to get immediate shipments. This prompt demand, however, has been insufficient to sustain the market. All of the metals are quieter, not alone zinc, but tin has declined. The old metals are unchanged. We quote, in carload lots, lake copper, 14.25c.; tin 33c. to 33.50c.; lead 5.60c.; spelter, 6.25c.; antimony, 7c.; in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 9.25c.; red brass, 8.75c.; yellow brass, 6.75c.; lead pipe, 4.50c.; zinc, 3.50c.; pewter, No 1, 20c.; tin foil, 22.50c.; block tin, 26c., all buying prices for less than carload lots.

St. Louis

AUG. 15.—The lead market is steady at 5.52½c. to 5.50c. carlots; slab zinc is steady at 6.30c. On old metals we quote light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

General Electric to Build Pacific Coast Factory

The General Electric Co. will build a new factory at Oakland, Cal., part of which will be devoted to increased facilities for the manufacture of switchboards and the remainder occupied by motor and instrument laboratories, service shops and offices. Official announcement of the project, which represents an investment of about $200,000, has just been made from the headquarters of the company at Schenectady.

The tract upon which the new factory will be erected comprises 23 acres on East Fourteenth and Fifty-fourth Streets, Oakland. The floor space of the factory will be 32,000 sq. ft. The building will be 131 by 236 ft., of brick and steel construction, with concrete floors and foundation, and will embody all the best features of modern construction. The contract has been let to the Foundation Co.

British Iron and Steel Market

American Coal Purchases Continue—America Has Bought 1,000 Tons of Cleveland Iron—All Prices Sag Except Galvanized Sheets

(By Cable)

LONDON, ENGLAND, August 15.

American demand for coal and coke continues and purchases are on a good scale. Canada also is inquiring for Welsh coal.

America is inquiring for ferromanganese and special and foundry pig iron, but the business done is unimportant; 1000 tons of special Cleveland foundry iron was sold last week for prompt shipment. Further business has been hampered by an increase in freight rates from Glasgow to Boston.

Scotch foundry iron has hardened to £5 5s. ($23.42) f.o.b. Other makes of pig iron show an easy tendency and home buying is dull. Italy is buying hematite. Makers are anxious to reduce stocks, which makes prices easier. Germany has been buying hematite; 500 tons of East Coast mixed numbers have been sold.

Export inquiry for finished steel is improving. India and Australia are buying plates, sheets and angles, but no large tonnages are involved. Home trade price fixing on finished steel was temporarily abandoned last week, and quotations generally are lower. Some works are not disposed to accept the new prices. Substantial orders for structural material have been placed on the Northeast Coast.

Iron and steel exports for July amounted to 251,473 tons.

There is improved Continental demand for steel, but it is difficult to set prices, owing to vagaries in exchange. South America, Chile and China have purchased plates. Sales have been made of merchant bars, angles, tees and sheets. India and Japan are endeavoring to resell wire, wire nails and plates. Belgian wire nails are now quoted at 14s. ($3.12) basis f.o.b., for October and November shipment.

Tin plate is easier for forward position, due to poor demand. South America and Canada are inquiring and Welsh makers anticipate securing orders. European buying is dull. Wasters stocks are decreasing. Welsh output was reported last week to be between 80 and 85 per cent of normal.

Demand for galvanized sheets is increasing and quotations are firm. South America paid £16 10s. (3.29c. per lb.) basis, f.o.b.

Continental black sheets have been sold at £10 7½s. (2.07c. per lb.) c.i.f., India. Japan is inquiring here, and also offering to resell.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.46 per £1, as follows:

Durham coke, delivered	£1	6¾s.				$5.96	
Cleveland No. 1 foundry	4	15				21.19	
Cleveland No. 3 foundry	4	7	& £4	8s.*		19.40 &	$19.62*
Cleveland No. 4 foundry	4	5	to 4	7		18.96 to	19.40
Cleveland No. 4 forge	4	2½	to 4	5		18.60 to	18.96
Cleveland basic	4	0				17.84	
East Coast mixed	4	10	& 4	10½*		20.07 &	20.18*
Ferromanganese	15	0				66.90	
Ferromanganese*	14	10	to 14	15		64.67 to	65.79
Rails, 60 lb. and up	7	15	to 9	0		34.57 to	40.14
Billets	7	0	to 8	0		31.22 to	35.68
Sheet and tin plate bars, Welsh	7	7½				32.89	
Tin plates, base box	0	19⅛	to 0	19½		4.27 to	4.35
						C. per Lb.	
Ship plates	9	0	to 9	10		1.79 to	1.89
Boiler plates	11	10	to 12	10		2.29 to	2.49
Tees	9	5	to 10	5		1.84 to	2.04
Channels	8	10	to 9	10		1.69 to	1.89
Beams	8	5	to 9	5		1.64 to	1.84
Round bars, ½ to 3 in.	9	5	to 10	0		1.84 to	1.99
Galvanized sheets, 24 g.	16	5	to 16	10		3.24 to	3.29
Black sheets	12	0				2.39	
Steel hoops	12	0	& 12	5*		2.39 &	2.44*
Cold rolled steel strip, 20 g.	23	2½				4.60	
Cotton ties, Indian specifications	15	0				2.99	

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:							
Belgium, September	£4	2½s.				$18.40	
Luxemburg, Sept.	4	0				17.84	
France, September	4	2½				18.40	
Billets:							
France	5	15				25.65	
Luxemburg	6	5				27.88	
Lorraine	6	5				27.88	
Wire nails (keg basis):							
Germany, August	0	14½				3.23	
Belgium	0	20½				4.57	
Wire rods, 5 mm. (0.2 in.):							
Belgium	7	5	to £10	7½s.		32.34 to	$46.28
Angles:						C. per Lb.	
Belgium, September	7	7½				1.47	
Tees:							
Belgium	8	5				1.64	
Merchant bars:							
Belgium, October	7	7½	to 7	15		1.47 to	1.54
Luxemb'g, October	7	7½	to 7	15		1.47 to	1.54
Germany, October	7	15	to 7	17½		1.54 to	1.57
France, October	7	7½	to 7	15		1.47 to	1.54
Channels:							
Belgium	7	10	to 7	12½		1.49 to	1.52
Joists (beams):							
France, Sept., Oct.	7	0	to 7	5		1.39 to	1.44
Belgium, Sept., Oct.	7	0	to 7	5		1.39 to	1.44
Luxemb'g, Sept., Oct.	7	0	to 7	5		1.39 to	1.44
¼-in. plates:							
Germany, Sept.	8	0	to 8	5		1.59 to	1.64
Belgium, Sept.	7	17½	to 8	0		1.57 to	1.59
Luxemburg and France, not offered.							
⅛-in. plates:							
Germany	9	0				1.79	
No. 8 gage wire:							
Belgium, August	14	10⅝				2.89	

New Labor Troubles Threatened—Markets Quiet and Easy—Better Export Prospects

LONDON, ENGLAND, July 27.—A further labor crisis has arisen which seems likely to seriously retard the long-looked-for revival in iron and steel in this country. At the end of the three months lockout of the engineers last month, a conference was held, when the employers proposed to introduce wage reductions amounting to 10s 6d in three instalments. A ballot has now been taken on these terms, and in a total poll of nearly 115,000, a majority of nearly 27,000 have declared for refusal of acceptance. What will be the actual result, however, is not quite clear at the moment, but it is certainly interesting to note that, of the total membership, only about 8 per cent returned votes at all.

In the meantime business in both pig iron and manufactured iron and steel has been quiet. Of course the holiday periods both in the North of England and in Scotland are partly responsible, but there seems to be a general opinion among consumers that, if they wait long enough, they will be able to place all their future requirements at considerably below to-day's prices. The freeing of Cleveland pig iron from minimum fixed selling prices has resulted in a drop in this material of about 2s a ton, while substantial business could doubtless be placed for still less money. There are quite plentiful supplies of No. 3 foundry, but the stock of No. 1 is scarce, and sellers hold firmly to the old price of 95s. It is hoped that America will buy again if the labor troubles continue in that country, but at the present time such purchases are confined to ferromanganese and special irons.

In finished iron and steel business does not improve, and, as a result, though prices generally are quotably unchanged, suitable specifications can be placed at less money. Export buying is quiet, but there are signs that demand from such sources is looking up, and hopes are being entertained of some good business with India before long. Continental competition is again being felt, not only for export but also with the home trade here, and though home trade prices on this side have been subject to a fixed agreement for a long time, instances have been found recently where makers have been allowed to make their own quotations to get the business which is badly needed. Consequently it is thought in many quarters that the only natural result is that this price fixing should be definitely abandoned.

PERSONAL

Carmi A. Thompson, Republican nominee for governor of Ohio, has been identified with the iron business since 1913. He was born in Wayne County, W. Va., Sept. 4, 1870, and his first work was that of a coal miner. He graduated from Ohio State University in 1892, was admitted to the bar in 1895, and later filled the following positions: member of the House of Representatives of Ohio, 1904 to 1907; Secretary of State of Ohio, 1907 to 1911; secretary to President Taft, July 1, 1912, to Nov. 20, 1912; treasurer of the United States, Nov. 20, 1912 to April 1, 1913. Mr. Thompson then became associated with James J. Hill as general manager of the Great Northern Iron Ore Properties and continued in that position until Oct. 1, 1917. He was president of the Cottonwood Coal Co. and South Butte Mining Co. of St. Paul from 1913 to 1917 when he resigned his positions in St. Paul and became associated with the Tod-Stambaugh Co., Cleveland becoming financially interested in that company and taking an active interest in its affairs as vice-president, which position he now holds. He is also chairman of the board of directors of the Marting Iron & Steel Co., Ironton, Ohio, in which the Tod-Stambaugh Co. is financially interested.

CARMI A. THOMPSON

A. R. Gould, a director and general manager of the St. Louis Malleable Casting Co., St. Louis, has resigned to become vice-president Malleable Iron Range Co., Beaver Dam, Wis. He will be associated in the active management with F. W. Rogers, president and general manager.

Henry Harnischfeger, president Pawling & Harnischfeger Co., Milwaukee, has returned from a business and recreation tour of the Far East, lasting six months. He visited Japan, China, the Philippines, India and other foreign countries with the primary object of investigating business conditions and possibilities with special reference to gasoline-driven excavating units manufactured. He witnessed the operation of one of the large type of excavators on the Imperial Japanese Railways by the Musashi Engineering Corporation. Mr. Harnischfeger said that, contrary to the general opinion, there is a growing market in the Far East for labor-saving machinery of all kinds.

Clark M. Osterheld, assistant general superintendent Stoughton Wagon Co., Stoughton, Wis., in charge of the motor truck manufacturing department, resigned Aug. 15 to assume active duty as president and general manager of the Stoughton Mfg. Corporation, which with associates he incorporated recently to engage in the manufacture of electric water heaters and other electrical devices of his design.

H. E. Collins of Rogers, Brown & Co., Boston, has resigned, effective Sept. 1, to accept a position with the Harry M. Hope Engineering Co., Boston. He formerly was associated with this engineering firm.

C. O. Rowe has been appointed manager of the steel department of Carson & Co., Pennsylvania Building, Philadelphia, broker in pig iron, steel, coal, coke, etc.

A. G. Bolenbaugh has resigned from the engineering department of the Truscon Steel Co., Youngstown, Ohio, to accept a position with the United Erecting Co., Los Angeles, Cal., effective Sept. 1.

Harold L. Stevens, who has been appointed general sales manager of Central Iron & Steel Co., Harrisburg, Pa., has spent practically his entire life in the steel business. He was employed in the Sweet mills at Syracuse, N. Y., and later by the Sweet's Steel Co., Williamsport, Pa. Some years later he joined the Lackawanna Steel Co., in the Buffalo sales department. He was made New England district sales manager of the Lackawanna Steel Co. about eleven years ago, with headquarters in Boston. A native of Portland, Me., he attended Cornell University and is an ex-president of the Cornell Club of New England. The change takes effect Sept. 1.

W. C. Robbins, for the past two and a half years general manager of the Eberhart Steel Products Co., Inc., Buffalo, is no longer with that company but is carrying on consulting and manufacturing work in the same city.

W. H. White, formerly connected with the United States Naval Ordnance plant, Charleston, W. Va., has been appointed superintendent of the open-hearth department Pittsburgh Crucible Steel Co., Midland, Pa., succeeding L. A. Lambing, resigned.

E. W. Rossiter has been appointed engineer of construction for Freyn, Brassert & Co. He was previously chief engineer of the Interstate Iron & Steel Co., Calumet River, Chicago, and prior to that was with the American Sheet & Tin Plate Co., the Minnesota Steel Co., and the Canadian Steel Corporation, Ltd., Ojibway, Ont.

E. L. Ford is president of the Youngstown Steel Co., Youngstown, Ohio, which is installing a mechanical puddling plant at Warren, Ohio. Mr. Ford is a son-in-law of Joseph G. Butler, Jr., Youngstown, and has been associated for many years with the development of the iron and steel industry of the Mahoning Valley. Mr. Ford is a director of the Youngstown Sheet & Tube Co. and a member of the executive committee of the Brier Hill Steel Co. The mechanical puddling machine to be used in the Warren installation is the result of years of experimentation by Mr. Ford and associates. It is modeled after a design by Mr. Ford, fully covered by patents. Plans provide for an extensive plant to consist of two blast furnaces, by-product coke oven complement and 16 mechanical puddling machines.

E. L. FORD

LeRoy Richards, for several years connected with the sales department of the Alan Wood Iron & Steel Co., Philadelphia, on Sept. 1 will become associated with A. B. Ambler, Pacific Coast representative of the same company, San Francisco. Mr. Richards will locate in Los Angeles, where he will be resident sales representative, with offices in the Higgins Building.

Paul H. Diver, who for four years has been sales representative of the Ohio Electric & Controller Co., Cleveland, has been appointed manager of sales.

C. J. Pagel, who has been associated with the Robbins & Myers Co. in the Cleveland district, has been appointed sales representative of the Ohio Electric & Controller Co., Cleveland, effective Sept. 1.

Charles E. Hulick, superintendent of blast furnaces of the Thomas Iron Co., Hokendauqua, Pa., has resigned, effective Sept. 1.

H. G. Naylor, formerly with the United States Radiator Corporation at Corry, Pa., has been appointed manager of the Niagara Radiator & Boiler Co. plant at Chicago.

Capt. Robert W. Hunt, Robert W. Hunt & Co., engineers, specializing in rail inspection, Chicago, has

Joseph G. Butler, Jr., at Home

A VISIT to the venerable manufacturer in Youngstown and to the McKinley Birthplace Memorial at Niles, Ohio.

(*Editorial Correspondence*)

YOUNGSTOWN, Aug. 10.—It was my privilege to-day to come to this busy capital of the Mahoning Valley to pay my respects to its First Citizen, Joseph G. Butler, Jr., the grand old man of the iron industry. Mr. Butler, now in his 84th year, sits in his big, comfortable chair—comfortable as any chair could be for one who suffers as he does. For more than two years Mr. Butler, as a result of being struck by an automobile after returning from the funeral of Henry C. Frick, has been unable to walk without assistance and at times the pain which he heroically endures is very severe. Although Mr. Butler admitted to-day that those dreadful pains were troubling him, there was nothing to indicate that fact as he most cordially received his visitors and talked of the past, present and future.

Emphasis should be placed on the present and future rather than on the past, for, while Mr. Butler delights in talking over the early days of iron making and politics, his thoughts are largely on the problems of to-day and of his plans for writing a new book and enlarging the beautiful art gallery, across the street from his home, which he had erected for the people of Youngstown. He is constantly adding to the art treasures and has in mind important enlargements of the building.

The large room in which Mr. Butler now spends so many of his hours overlooks an extensive lawn, made beautiful by the rich green of the grass and the choice flowers of many colors. The walls are lined with books and almost hidden by pictures. Everything has some historic interest, recalling the progress of the iron industry, stirring days of politics from the time of Lincoln to Harding, or delightful journeys to many parts of this country and Europe. Inscriptions on photographs, particularly that of President Harding, written the night he received the news that he would be the next occupant of the White House, show gratitude and affection. A year or so ago a part of the Butler home was destroyed by fire. Numerous paintings and other treasures were burned. One, a photograph of the King of Belgium, with whom Mr. Butler became well acquainted while visiting Brussels with other steel manufacturers a few years ago, has been graciously replaced by his majesty.

Mr. Butler's visitors include from time to time some of the most distinguished men in the United States. Charles M. Schwab never misses an opportunity to drop in on "Uncle Joe." Justice John H. Clarke of the United States Supreme Court is a resident of Youngstown and while spending his vacation at home, is a frequent caller upon Mr. Butler.

After reluctantly bidding Mr. Butler good-bye, I was driven past the homes of countless happy, prosperous mill workers to Niles, the birthplace of William McKinley, and visited the McKinley Memorial at Niles, which is indeed a monument to Mr. Butler, who conceived the idea and with untiring energy worked in carrying it out, as well as to Ohio's second martyr President, whose life was so closely connected with the prosperity of the iron industry, especially the tin plate industry, established through the McKinley law, despite all the ridicule that was heaped upon the author. Although I had heard much about the memorial, it was far beyond my expectations. The great beauty of the marble structure is a pleasant surprise to one who had gotten his idea of it from the photographs, which do not do it justice. The heroic statue of McKinley is, of course, the center of attraction and is a real work of art, as indeed are almost every one of the bronze busts of leaders of industry and statesmanship—Taft, Roosevelt, Root, Harding, Gary, Farrell and others. The relic room chains the attention and the library wins the admiration of all, while the assembly room is a most important feature.

One can hardly resist regretting that this memorial was not erected in a greater center of population, where a much larger number of people would be able to see it and be impressed by it, but after all the relatively few who do visit it go there from many parts of this country because it has a genuine attraction for them and the citizens of the Mahoning Valley, to whom it is most easily accessible, are not satiated by sightseeing and are more deeply impressed than would be the citizens of a large city. "Uncle Joe" was right. Niles is the proper place for the McKinley Memorial.

G. S.

recovered from a severe illness which confined him to his home and has resumed his duties at the office of the company. Captain Hunt is in his eighty-fourth year.

Joseph Edmonds, formerly superintendent structural mill finishing ends, Illinois Steel Co., South Chicago, was recently appointed superintendent of finishing mills, No. 2 plant, Inland Steel Co., Indiana Harbor, Ind.

Morris W. Lee, formerly vice-president, Frank D. Chase, Inc., Chicago, has established an advertising agency at 220 South Michigan Avenue, Chicago.

Obituary

WILLIAM G. FLAIG, sales representative specializing in railroad work, Niles-Bement-Pond Co., at Chicago, died suddenly in that city on August 11, at the age of 42.

VALENTINE B. CHAMBERLAIN, JR., mill superintendent Stanley Works, New Britain, Conn., died suddenly Aug. 5, at Oak Bluffs, Mass. Mr. Chamberlain was born in New Britain thirty-six years ago.

CHARLES GRAY COOPER, whose death on Aug. 4 after an illness dating from April, 1918, was mentioned in this column last week, was for forty-five years identified with the C. & G. Cooper Co., engine builder, Mt. Vernon, Ohio. He was born in Mt. Vernon Dec. 11, 1845, and was the son of Elias Cooper, who, with his brother Charles Cooper, founded Cooper company 90 years ago. He was educated in the public schools of Mt. Vernon and at Oberlin College. He served in the Civil War and became connected with the Cooper company in 1866, at which time it was a partnership. At its incorporation in 1898, he became secretary and served in this capacity until the death of the president, F. L. Fairchild, in 1912, when he was made president. He served as president until his illness in 1918, when B. B. Williams was made president and Mr. Cooper became chairman of the board of directors. Mr. Cooper was one of the pioneer engine builders of this country and practically his entire life was spent in the developing and building of Cooper steam and gas engines. He was a member of the Masonic bodies of Mt. Vernon and for many years an officer of the Congregational Church. The members of his immediate family who survive him are a widow, two daughters and a son.

WILLIAM C. PEARSON, senior member of D. G. Gautier & Co., iron and steel jobbers, 50 Church Street, New York, died at his home on Saturday, Aug. 12

Machinery Markets and News of the Works

STRIKES AFFECT TOOL TRADE

August Business Not Up to That of July, but Prospects Are Good

Rising Costs of Manufacture Disturbing to Machinery Manufacturers Who Consider Advances

The fact that August sales of machine tools are not up to the July record is attributed solely to the uncertain conditions which have arisen because of the continuation of the coal miners' and railroad shop mechanics' strikes. A considerable volume of business is pending, which it is expected will be released when a settlement of the strikes has made the outlook clearer.

Railroads which have recently made known their machine-tool requirements are taking no action and are not expected to do so until their labor troubles are over. There has been some small buying by a few roads, but the large lists of the New York Central, Illinois Central and other roads are dormant.

Industrial companies are also losing interest in new equipment, as fuel shortage threatens their operations. Some plants have already reduced their working forces or the number of working hours, while a few are at the point of being shut down because of inability to get coal. The General Electric Co., Schenectady, N. Y., is getting prices on a large number of tools preparatory to issuing a formal inquiry, this being the largest new prospect in the market.

It is expected that the Milwaukee Sewerage Commission will be in the market in about two or three months for machine tools and other equipment for a shop to be erected on Jones Island. The Lima Corporation, Lima, Ohio, will require a number of tools, but the list has not as yet been issued.

Machine-tool builders are becoming more disturbed over rising costs of manufacture. Pig iron, steel and labor costs are all on the upturn, and with a low rate of operations the overhead charges on new machine tools, it is stated, not only make any further general reductions out of the question but are causing manufacturers to study seriously the question of putting into effect advances which will cover their higher costs. In all probability these advances will come in the fall.

New York

NEW YORK, Aug. 15.

THE machine-tool trade has its attention focused largely on the termination of the coal and railroad strikes in the belief that the present business uncertainty will continue as long as these strikes remain unsettled. While some in the trade enjoyed a fairly good July business there is no indication thus far that August will keep pace. Yet prospects are encouraging for better business as soon as the industrial situation has become clarified. The General Electric Co., Schenectady, N. Y., has asked for preliminary prices on a large number of machine tools, these prices, it is stated, to be used as a basis for preparing a machine-tool budget to cover a formal list which will be issued soon. This is the outstanding development of the week as regards future business.

Railroads are buying in a small way, the larger purchases that were expected being postponed until the shop mechanics' strike is ended. The Chesapeake & Ohio Railroad has bought a 42-in. boring and turning mill and a 1100-lb. hammer; the Texas & Mexican Railroad has ordered a 79-in. driving wheel lathe from a New York company, and the Denver Tramways have ordered a 42-in. car-wheel borer.

The crane market has been quiet the past week, few new inquiries having appeared and but few awards being reported. The 10-ton, 44-ft. span overhead traveling crane inquired for recently by the American Car & Foundry Co. has been postponed. Other small inquiries which have been in the market for some time are reported to have been postponed.

The sale of 36 locomotive cranes at Boston on Aug. 9, by the Navy Department, resulted in high bids being submitted on the various lots by the General Equipment Co., New York; Thomas F. Carey, 120 Liberty Street, New York; the Potomac Power Co., Hagerstown, Md.; B. M. Weiss, Philadelphia, and Philip T. King, 30 Church Street, New York. The cranes, which will probably be awarded to these high bidders, consist of ten 15-ton and one 10-ton, Brownhoists; a 25-ton and 20-ton Brownings; one 15-ton American; four 5-ton and one 10-ton Osgoods; two 20-ton, two 15-ton and one 22-ton Orton & Steinbrenner cranes; four 15-ton and one 10-ton Industrials; one 30-ton Ohio, 20-ton Linkbelt, 12-ton McMyler-Interstate, 15-ton Bucyrus, 15-ton Browning Engine Co. and a 7-ton Victor R. Browning.

Among recent purchases are:

American Car & Foundry Co., New York, a 15-ton locomotive crane from the Orton & Steinbrenner Co.

Southern Pacific Co., 165 Broadway, New York, a 25-ton locomotive crane with bucket from the Ohio Locomotive Crane Co.

General Electric Co., for Atlanta, Ga., a 10-ton, 22-ft. 6-in. span overhead traveling crane from the Northern Engineering Works.

Bethlehem Steel Co., Bethlehem, Pa., a 10-ton, 40-ft. span overhead traveling crane from the Northern Engineering Works.

Utica Heater Co., Utica, N. Y., a 5-ton, 35-ft. span overhead traveling crane from the Niles-Bement-Pond Co.

Warner Sugar Refining Co., New York, a 10-ton overhead traveling crane, for use in Cuba, from the Reading Chain & Block Corporation.

Johns-Manville Co., Inc., New York, two industrial trucks for Waukegan, Ill., from the Towmotor Co., Cleveland.

Valabhas Runchordas & Co., 70 Apollo Street, Bombay, India, have written to THE IRON AGE stating that they are in the market for the following equipment and desire to buy against cash in New York: Dynamo for copper plating and nickel plating; complete installation for copper and nickel plating; oil engines, steam engines, small boiler, electric motors, lathes, milling machines, band saws, planers and tools for small work shop; complete machinery for the manufacture of phonograph horns and toys; machinery for manufacturing phonograph and sewing needles on small scale; complete machinery for making phonograph records; wood-working machines for phonograph cabinets; also other equipment for a complete phonograph manufacturing plant. Specifications may be examined at the New York office of THE IRON AGE or information will be given by mail.

A one-story power house and refrigerating plant will be erected at the new candy factory to be built by Ridley's, Inc., 345 West Fortieth Street, New York, at Long Island City, estimated to cost in excess of $100,000. W. Kenneth Watkins, company address, is architect.

The Board of Education, Saratoga Springs, N. Y., is arranging a list of equipment for installation in the machine shops and vocational department of its new high school.

The Egyptian Lacquer Mfg. Co., 5 East Fortieth Street, New York, is taking bids for a one-story building, 50 x 100 ft., on Maple Avenue, Los Angeles, for a Pacific Coast works. Mott M. Marston, 533 San Fernando Building, Los Angeles, is architect.

Parish Axles, Inc., 1819 Broadway, New York, manufacturer of automobile axles, with plant at Poughkeepsie, N. Y., has tentative plans for a new factory at York, Pa.

An automobile service and repair works for company trucks will be constructed by the Holland Laundry Co., 372 Pacific Street, Brooklyn, on Twenty-fifth Street, in connection with a new three-story plant building.

The Superior Aluminum Corporation, 175 Fifth Avenue, New York, has leased floors in the building at 132 Bleecker Street for local works.

Jacob Roth, New York, has leased the building at the northwest corner of Ninth Avenue and 209th Street for the operation of an automobile service and repair works. Immediate possession will be taken.

The American Lamp Co., 25 West Forty-third Street, New York, organized with a capital of $2,000,000 to manufacture incandescent and electric lamps, is concluding the purchase of the former plant of the New England Products Co., Stamford, Conn., manufacturer of kindred specialties, now in receivership. The company is also planning the establishment of branch plants at Newark, N. J.; Philadelphia, Detroit, Chicago and New Orleans. It is proposed to operate one of the largest works at Long Island City where a site will be selected. William H. Young is president, and Walter L. Tremper, vice-president and treasurer.

Charles R. Barnes, 246 Washington Avenue, Albany, N. Y., has awarded a contract to the William G. Sheehan Building Co., 28 DeWitt Street, for a one-story automobile service and repair works, 65 x 165 ft., on Central Avenue, to cost about $85,000.

Material-handling machinery, etc., will be installed in the new warehouse to be erected by the Republic Storage Co., 541 West Thirty-fourth Street, New York, estimated to cost about $200,000. Russell G. Cory, 30 Church Street, is architect and engineer.

The Tidal Oil Co., 11 Broadway, New York, a subsidiary of the Tide Water Oil Co., same address, operating oil refineries and gasoline plants in Oklahoma and Kansas, has received an appropriation of $1,000,000, from the parent company, to be used for extensions and improvements. The bulk of the fund will be used for oil refinery additions, including new equipment.

The Electric Supply & Equipment Co., Hartford, Conn., will take bids at once for a new four-story building, 40 x 60 ft., at Broadway and Church Street, Albany, N. Y., for branch works. It will cost about $50,000.

The State Highway Department, 8 Elizabeth Street, Utica, N. Y., L. D. Brownell, division engineer, will commence the erection of a one-story machine shop, 45 x 210 ft., with storage department for road machinery and equipment.

A vocational department will be installed in the new high school, 53 x 170 ft., to be erected at Greenburgh, N. Y. Jallade Lindsay & Warren, 129 Lexington Avenue, New York, are architects.

Francis J. Sheridan, New York, has leased the four-story and basement building at 147-51 West Eighty-third Street, for an automobile service and repair works.

A vocational department will be installed in the new high school, 160 x 200 ft., to be erected at East Hampton, L. I., estimated to cost in excess of $150,000. A. F. Gilbert, 80 Maiden Lane, New York, is architect.

The West India Sugar Finance Corporation, 129 Front Street, New York, operating plants in the West Indies, is arranging for an increase of $835,000 in its preferred stock, the proceeds to be used for extensions and improvements, including the consolidation of other sugar refining properties in the same district.

Hoisting equipment, conveyors, loading and unloading machinery, etc., will be installed in the new distributing and storage plant to be constructed at Roosevelt, N. J., by Ichabod T. Williams & Sons, Eleventh Avenue and Twenty-fifth Street, New York, lumber merchants. Water-front property totaling 69 acres has been acquired from the Bethlehem Shipbuilding Corporation, heretofore used in connection with the Moore shipbuilding plant. The lumber terminal will occupy the entire site.

A vocational department will be installed in the two-story and basement high school, 60 x 195 ft., to be erected at Bridgeton, N. J., for which foundations are now being laid. It will cost about $200,000. Ritter & Shay, North American Building, Philadelphia, are architects.

An electrically operated pumping plant and industrial railroad will be constructed in connection with the new sewerage disposal plant to be built by the Hackensack Improvement Commission, Hackensack, N. J., to cost about $481,000. A general contract for the project has been let to the Public Service Production Co., Public Service Terminal, Newark, N. J.

Robert O. Beebe, director Essex County Vocational Schools, 316 Essex Building, Newark, will lease a building in the Watsessing district, Bloomfield, N. J., for the establishment of a Boys' Continuation School. The initial shop space will approximate 4000 sq. ft. In connection with the new Seymour Vocational School, Sussex Avenue and First Street, Newark, which will be ready for occupancy in September, a number of departments will be omitted from immediate service and equipped later; one of these will be the foundry and another, the steam fitting department.

The Durant Motors, Inc., 1819 Broadway, New York, is arranging to transfer different features of production from the Long Island City plant to the new works at Elizabeth, N. J., as soon as the latter plant is ready for service, about the middle of September. The Long Island City works will then be arranged to manufacture a limited number of Flint automobiles for the Flint Motor Co., a recently organized subsidiary. The machinery installation at the new Elizabeth works will require several months for entire completion.

An electrically operated pumping plant will be installed by the Township Committee, Cove and Centre streets, Pensauken, N. J., in connection with a new sewerage system. Remington & Vosbury, 601 Market Street, Camden, N. J., are engineers.

Chicago

CHICAGO, Aug. 14.

THE machine-tool market has become exceedingly quiet, inquiries having disappeared almost entirely and others having dropped to the vanishing point. The railroads are taking no action on their inquiries and industrial plants are losing interest in new equipment as the fuel shortage threatens operations. In a number of instances local machinery houses have received reports that certain plants have reduced operations because of lack of coal and some of them, in fact, are at the point of closing down entirely. The Continental Motors Co., Muskegon, Mich., has added a boring mill and a large special manufacturing grinding machine to its recent list of purchases. This order is one of a very few which are reported in the local market.

The Pullman Co., Pullman, Ill., has ordered a railroad coach hoist from the Whiting Corporation, Harvey, Ill.

The E-K Mfg. Co., 31 North State Street, Chicago, recently incorporated with $60,000 capital stock, will manufacture electric soldering machines for jewelers, opticians and dentists, and has leased a plant at 1775 Ogden Avenue. Very few metal-working machines will be used as most of the parts are to be manufactured outside. A steel cutting shear is the only machine used at present. The officers are P. N. Nelson, president; D. C. Spencer, vice-president and secretary; L. S. Nelson, treasurer.

The West Woodworking Co., 304-08 North Ada Street, Chicago, has let contract for a one-story factory to cost $16,000.

The Duffin Iron Works, 4843-55 South Kedzie Avenue, Chicago, has let contract for a one-story addition, 40 x 65 ft., to cost $10,000.

The Manufacturers Terminal Co., Waukegan, Ill., has had plans prepared by Fox & Fox, architects, 38 South Dearborn Street, Chicago, for remodeling a three and five-story factory, 43 x 62 ft., and for providing a small addition.

A contract has been awarded by George S. Kingsley, 109 North Dearborn Street, for a one-story garage, 100 x 125 ft., at 916-22 Madison Street, Oak Park, Ill., for A. Y. Lucal, to cost $25,000.

The Schuessler Foundry Co., Alton, Ill., has let contract

for a new foundry, 120 x 230 ft., around which are to be constructed a number of smaller buildings.

The Sloan Valve Co., 4300 West Lake Street, Chicago, will build a one-story plant, 39 x 142 ft., to cost $10,000.

The McDonald Loose Leaf Co., 638 Federal Street, Chicago, has let contract for a one-story factory, 95 x 125 ft., at 1809-17 Summerdale Avenue, to cost $30,000.

The report that the Ford Motor Co. has purchased a site in the Calumet industrial district of Chicago has been confirmed. A tract of 80 acres has been purchased from the Calumet & Chicago Canal & Dock Co. The property is southeast of the Calumet River and west of Torrence Avenue, running south to the South Shore Railroad at about 130th Street. An assembling plant will be erected.

The McKelvey Pulverizing Co., 136 West Lake Street, Chicago, recently incorporated, will grind or pulverize pigments by a new method, using the McKelvey patent machine for pulverizing by compressed air. The company has equipped a plant at Utica, Ill., formerly occupied by the Black Ball Cement Co. Its work for a time will be of an experimental nature and it will not manufacture any machinery at present outside of the initial McKelvey machine which is now completed. The officers are H. V. Gressang, president; David McKelvey, general manager, and J. Neuburger, secretary and treasurer.

The Public Service Co. of Northern Illinois will commence the construction of a new generating station at Waukegan, Ill. about Sept. 1. The first unit will contain a 20,000-kw. turbine, a condenser and three boilers of 1430 hp. each. Plans provide for an ultimate layout comprising eight turbine units, developing 250,000-kw. A tract of 80 acres adjoining Waukegan will be occupied by the plant.

The American Foundry & Furnace Co., manufacturer of furnaces and boilers, Bloomington, Ill., is building an addition.

The Bowman Dairy Co., 140 West Ontario Street, Chicago, will build a new one-story machine shop, 45 x 90 ft., at its plant at Harvard, Ill.

Fred Riebel & Co., 6221 Wentworth Avenue, Chicago, manufacturer of sheet iron and metal products, is said to be planning the installation of machinery to manufacture metal cans and containers.

A vocational department will be installed in the new three-story high school, 150 x 250 ft., with one-story extension, 40 x 90 ft., to be erected at St. Paul, Minn., estimated to cost about $325,000, for which revised bids will be called. F. X. Lewes is city architect.

The Northwestern States Portland Cement Co., Mason City, Iowa, will commence the immediate erection of a new one-story machine shop.

The United States Government, Post Office Department, Washington, has tentative plans under consideration for new works in the vicinity of Maywood, Ill., to manufacture aeroplanes and parts, primarily for mail service. The plant is estimated to cost in excess of $500,000.

The Advance Rumely Co., Laporte, Ind., manufacturer of agricultural machinery, etc., is taking bids for a two-story and basement building, 100 x 132 ft., at Ninth and Farnam streets, Omaha, Neb., for a factory and distributing branch, estimated to cost about $200,000, including equipment. John Latenser & Sons, 732 Peters Trust Building, Omaha, are architects.

The Chicago, Burlington & Quincy Railroad Co., Omaha, Neb., will commence the construction of a new electric power plant at Plattsmouth, Neb., to cost about $50,000.

W. F. Bleck & Co., 1846 Lamon Avenue, Chicago, is taking bids for a one and two-story and basement addition to its sash and door manufacturing plant, 180 x 200 ft., to cost about $100,000, including machinery. H. H. Green, 304 South Wabash Avenue, is architect.

The Commonwealth Edison Co., Chicago, has awarded a general contract to the George A. Fuller Co., 140 South Dearborn Street, for a new electric generating plant at 100th Street and the Calumet River, six-stories, 120 x 280 ft., estimated to cost $1,000,000.

The St. Paul Casket Co., 227 West Seventh Street, St. Paul, Minn., is completing plans for a new four-story plant, 95 x 150 ft., at Griggs and University avenues, estimated to cost about $140,000, including machinery. A. H. Stein, 601 Endicott Building, is architect. Ernest C. Reiff is president.

The Pullman Co., 79 East Adams Street, Chicago, is planning for enlargements in its automobile body manufacturing works. Up to the present time manufacture to a large extent has been limited to bodies for the Packard Motor Co., Detroit.

The Universal Office Devices Co., Inc., 56 East Superior Street, Chicago, desires to get in touch with companies equipped to manufacture a sheet metal part about 0.025 in. thick and 3 in. long by 1⅝ in. wide, with a ⅜-in. flange, and having two slots cut lengthwise 2⅝ in. by ⅛ in. wide. Parts made from wire about 0.125 in. thick, bent in horseshoe form, 2⅝ in. long and 1⅜ in. between legs, and notched on each leg, are also required.

Philadelphia

PHILADELPHIA, Aug. 14.

THE Jones Machine Works, Inc., Fifty-third Street and Lansdowne Avenue, Philadelphia, manufacturer of machinery and tools, will break ground at once for a new plant on property recently acquired at Primos, Pa., to include a machine shop, foundry, pattern shop and minor structures. The erection of the foundry will be deferred for several months.

The Logan Ice Mfg. Co., Tenth Street and Windrim Avenue, Philadelphia, has plans in progress for four one-story buildings to comprise a new plant. J. T. Hockstra, 1713 Sansom Street, is architect. C. W. Roberts is president.

A one-story power house, with cooling tower and other auxiliaries, will be constructed by the Philadelphia Brewing Co., Philadelphia, at Fairhill and Clearfield streets.

The Corrugated Container Co., Trenton and Venango streets, Philadelphia, will install new cutting and creasing machinery at its plant.

The F. W. Hosbach Cabinet Works, 2415 South Street, Philadelphia, will build a new two-story plant, 65 x 76 ft., at Twelfth and Brown streets.

The George W. Blabon Co., Twenty-first Street and Hunting Park Avenue, Philadelphia, will install additional tools and equipment in the machine shop at its linoleum plant.

The Northeastern Ice Mfg. Co., Front and Luray streets, Philadelphia, has awarded contract to E. R. Hall, 34 South Seventeenth Street, for a new building to cost $50,000.

The Philadelphia Rapid Transit Co., 810 Dauphin Street, Philadelphia, has arranged for a bond issue of $2,150,000, a portion of the proceeds to be used for extensions and improvements, including power houses and equipment. W. C. Dunbar is vice-president.

The Hurley Motor Co., 219 North Broad Street, Philadelphia, has awarded contract to Cramp & Co., Denckla Building, for a new two-story service and repair building, 100 x 204 ft., at Thirty-first and Thompson streets, estimated to cost in excess of $100,000. J. Scott Hurley is president.

A one-story automobile service and repair works, 90 x 165 ft., for company trucks and automobiles, with department for wagon work, will be constructed by the Breyer-Sharpless Milk Co., Ninth and Cumberland streets, Philadelphia. In connection with a new dairy building the structure will cost about $100,000.

The William Cramp & Sons Ship & Engine Building Co., Richmond & Norris streets, Philadelphia, is reported to be planning for enlargements in the drydocks, including the addition of shop and repair facilities.

Charles B. Warren, superintendent of purchases Board of Education, 9 South Stockton Street, Trenton, N. J., will receive bids until Aug. 18 for manual training supplies needed at the public schools during the coming school year, as per specifications on file.

The Coatesville Boiler Works, Coatesville, Pa., is disposing of a bond issue of $300,000, a portion of the proceeds to be used for the purchase of additional equipment.

The Excelsior Coal Co., West Excelsior, Pa., has authorized the immediate preparation of plans for rebuilding its anthracite coal washery, recently destroyed by fire. A list of equipment is being arranged.

The Board of Education, Herrick Center, Pa., is planning for the early purchase of equipment for installation in the vocational department at the local high school. G. B. Giles is secretary.

The Reading Hardware Co., Sixth and Willow streets, Reading, Pa., has plans in progress for a new power house, 50 x 96 ft., to be used in connection with a seven-story addition. George Gerhard & Sons, 619 Penn Street, are architects.

The Stalium Metals Co., Temple, Pa., recently organized to manufacture special metal products, will commence the erection of a new one-story foundry and machine shop, estimated to cost in excess of $150,000, including equipment. S. S. Staley heads the company.

A vocational department will be installed in the proposed high school to be constructed in the Allison Hill district, Harrisburg, Pa., estimated to cost in excess of $250,000. A site is being selected and plans will be prepared at an early date.

The York Mfg. Co., York, Pa., manufacturer of ice-making and refrigerating machinery, has plans under consideration for a new five-story building at its plant, 60 x 100 ft., estimated to cost in excess of $300,000.

The Boyertown Burial Casket Co., East Greenville, Pa., is planning for the erection of an electric light and power plant for works service.

A vocational department will be installed in the new two-story high school, 90 x 180 ft., to be erected at Jenkintown, Pa., for which revised plans are being drawn. It is estimated to cost about $225,000. Heacock & Hokanson, 1218 Chestnut Street, Philadelphia, are architects.

The Coopersburg Casket Co., Coopersburg, Pa., has construction under way on a new two-story plant.

The Solomon's Radiator Repair Works, Harrisburg, Pa., recently organized, will operate a general sheet-metal works and repair shop at 252 Hamilton Street. M. Solomon is general manager.

A vocational department will be installed in the new two-story junior high school to be erected at Ardmore, Pa., estimated to cost about $540,000, for which foundations will be commenced at an early date. Savery & Scheetz, Stephen Girard Building, Philadelphia, are architects.

A power house will be built by the Worth Chocolate Co., Hershey, Pa., in connection with its new factory at Cleona, Pa. Harvey T. Hauer, 829 Cumberland Street, Lebanon, Pa., is architect. Harry Worth heads the company.

Albert Hanker, New Cumberland, Pa., operating a box factory, has tentative plans for a new one-story plant for the manufacture of a patented window, with lifting and locking devices, etc., for which he has purchased the patents. He is also interested in the erection of a new local automobile body manufacturing works.

Fry Brothers, 310 West Fourth Street, Williamsport, Pa., will commence the erection of a new one-story automobile service and repair works, 125 x 130 ft., on West Fourth Street.

The Audubon Wire Cloth Co., Audubon, N. J., is adding another one-story unit to its plant to take care of growing business. When completed the present floor space will be doubled and will cover an area 145 x 180 ft. Robert F. Korb is president and general manager.

New England

BOSTON, Aug. 14.

UNCERTAINTY of the coal and railroad labor situation continues to restrict business in the New England machine-tool market. A sale of a 14 x 8 in. full automatic lathe, costing about $1,500, to a Rhode Island manufacturer, with a prospect of the firm taking an additional dozen machines, is the most noteworthy development for new tools. The Lawrence, Mass., school list is still pending, the trade being inclined to hold off because of conditions connected with the deal. The list includes 10 12-in. engine lathes, one 16-in. and one 14-in. lathe, a milling machine, planer, drill press, shaper, sensitive drill and other machinery, in addition to considerable wood-working equipment, all motor driven, and a complete blacksmith outfit. A New Bedford, Mass., piston ring maker, who recently purchased four lathes, two with turret attachments, is in the market for additional new tools costing about $5,000. Three or four other sizable inquiries for new tools are out, details being withheld. One of these inquiries is for export. Business in used machine tools has been further restricted by the announcement that the equipment of a Quincy, Mass., shop of fair proportions, will be sold at auction this week.

A Middle West maker of drill presses whose prices were considerably out of line with other drill presses, has made a substantial reduction in prices. New England machine-tool builders are understood to be working on new price schedules, which will show an advance and be announced probably in September or October.

A Worcester machine tool builder has contracted with the Wickwire-Spencer Steel Co. for the building of special machinery, the order being of sufficient size to keep the plant running on its present schedule two months.

The Boston & Maine Railroad Co., Springfield, Mass., has work under way on an addition to works at Holyoke, Mass., which will be used for repairing locomotives. It is proposed to provide a capacity for handling 20 engines at one time.

The Walsh Boiler Works, Holyoke, Mass., has contracted with the Boston & Maine Railroad for a considerable amount of locomotive boiler repair work. No new equipment is required.

The Hoyt Silver Co., 338 Pearl Street, New York, has incorporated to manufacture stainless metal to be used in cutlery at Milford, Conn. Plans call for a factory to give employment to about 300.—William T. Hoyt is president.

A vocational department will be installed in the new two-story and basement high school, 66 x 161 ft., to be erected at Shrewsbury, Mass. Chester R. Stacey is superintendent of schools in charge.

The Holyoke Supply Co., 210 Race Street, Holyoke, Mass., manufacturer of pipe, plumbing equipment, etc., has awarded a contract to P. J. Kennedy, 464 Maple Street, for a five-story addition to cost about $50,000.

The Bassick Co., Austin Street, Bridgeport, Conn., manufacturer of casters and hardware specialties, is planning for the installation of a number of machine tools, including lathe, milling machine and drill press.

William H. Hickey, Jr., Dorchester, Mass., has acquired the building at 1233-45 Dorchester Avenue, corner of Hancock Street, and will remodel the structure for an automobile service and repair works. A machine shop will be installed.

A vocational department will be installed in the new three-story high school to be erected at Fall River, Mass., in the North Park district, estimated to cost about $400,000. N. S. Chase, 583 Center Street, is architect.

The Gloucester Electric Co., Gloucester, Mass., has made application for permission to issue capital stock for $91,600, the proceeds to be used for extensions and improvements.

The Boston Ice Co., 262 Heath Street, Boston, will build a new plant to cost about $200,000, including machinery. Plans have been completed.

The Standard Oil Co., 26 Broadway, New York, has surveys under way for its proposed new oil distributing plant at Middletown, Conn., estimated to cost in excess of $500,000 with equipment.

The Deerfield Valley Paper Co., recently organized, has acquired the plant and business of the Monroe Bridge Paper Co., Monroe Bridge, Greenfield, Mass., and will operate the mill in the future. Extensions and improvements are planned.

E. H. Blake, 18 Harvard Avenue, Dorchester, Mass., will commence the erection of a new one-story automobile service and repair building, 100 x 120 ft., on Harvard Avenue. James T. Ball, Trinity Court, Boston, is architect.

The Metropolitan Concrete Block Co., Danbury, Conn., will build a plant and install complete automatic machinery for lowest production cost. Charles Woods is in charge.

The Dasco Spring Cover Co., Allston, Mass., has leased a floor of the Wilcox factory at Athol Highlands, Athol, Mass., for a new works to manufacture spring covers for automobile service.

Baltimore

BALTIMORE, Aug. 14.

J. ROSENBLATT & CO., 32 South Howard Street, Baltimore, desire to hear from companies equipped to cut, stamp and curl flat, decorated tin sheets into trays 13¼ in. square in lots of 10,000. Other stampings wanted are doors 11 x 15 in., from galvanized sheets in quantities of 5000 or more.

The Edro Richardson Brass Co., 318 North Holliday Street, Baltimore, will break ground at once for a one-story addition to its foundry, estimated to cost about $35,000.

The Board of Awards, office of the City Register, City Hall, Baltimore, will take bids until Aug. 23, for machinery in the vocational department of Junior High School No. 47, as per specifications at the office of the Board of School Commissioners, Madison and Lafayette avenues. John H. Roche is secretary of the board.

The Security Cement & Lime Co., Equitable Building, Baltimore, is planning for enlargements in its plant at Hagerstown, Md., to increase the capacity about 50 per cent. New equipment will be installed.

The Charlottesville & Albemarle Railway Co., Charlottesville, Va., will install new electrical and other equipment at its power plant.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Sept. 5 for one I-beam crane, for the Mare Island Navy Yard, San Francisco.

The Post Office Department, office of the purchasing agent, will receive bids until Aug. 18, for two trip hammers.

The Kneip Motor Car Co., 1017 Eutaw Street, Baltimore, has awarded contract to the Consolidated Engineering Co., Calvert Building, for a two-story service and repair building, 40 x 150 ft. The Franklin Motor Car Co., will occupy

a portion of the structure. Otto C. Simonson, Inc., Maryland Casualty Building, is architect.

A vocational department will be installed in the new one and two-story high school, 80 x 150 ft., to be erected at Smyrna, Del., for which bids are being asked until Sept. 5. The Delaware School Auxiliary Association, du Pont Building, Wilmington, is in charge.

The Metallic Press Cloth Co., Augusta, Ga., is planning for the establishment of a factory to manufacture metallic cloth for oil mill service. William A. Lee is president.

Fleming Aytes, 1006-A Bacon Street, Richmond, Va., is planning for the establishment of a factory to manufacture special automobile parts.

A vocational department will be installed in the new two-story and basement high school, 54 x 100 ft., to be erected at Franklin, Va. W. Newton Deihl, Monroe Building, Norfolk, Va., is architect.

S. J. Schmenner, 1422 Whitelock Street, Baltimore, has filed plans for a two-story automobile service and repair building, 50 x 81 ft., at 2913-37 Walbrook Avenue.

Hugh McRae, Wilmington, N. C., is organizing a company to build and operate several industrial plants in a portion of New Hanover County, including a machine shop, crate manufacturing plant, and basket factory.

The Strickland Machine Shop, 2322 East Main Street, Richmond, Va., is planning for the installation of a new lathe and drill press.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, is planning to rebuild the coal handling tower at its Spring Garden power plant, recently destroyed by fire with loss of about $25,000.

The Atlanta Glass Mfg. Co., P. O. Box 439, Atlanta, Ga., is inquiring for glass manufacturing machinery and mechanical equipment.

H. C. Richardson, 1918 East Franklin Street, Richmond, Va., is planning for the installation of a lathe, bench tools and other mechanical equipment in his machine and automobile repair shop.

A vocational department will be installed in the new high school to be erected at Vanceboro, N. C., estimated to cost about $150,000, for which foundations will be laid at once.

The L. C. Isenhour Co., Colon, N. C., has tentative plans for the establishment of new works to manufacture brick, tile, etc.

The Chapin-Sacks Mfg. Co., First and M streets, N. W., Washington, will build a new three-story ice plant, 109 x 120 ft., estimated to cost about $75,000.

The Reding Gold Mining Co., Danville, Va., recently organized, will establish a power house in connection with its proposed plant in the vicinity of Ashboro, N. C. Motors and other electrical and mechanical equipment will be installed. E. L. Walton is president.

The Port Development Commission, Baltimore, has preliminary plans in progress for a large storage plant on the municipal wharf at Hughes Street.

A vocational department will be installed in the new high school to be erected at Newton, N. C., estimated to cost about $100,000. Benton & Benton, Wilson, N. C., are architects.

Henry M. Earle, Spartanburg, S. C., representing bond holders of the Carolina Light, Power & Railway Co., is arranging for the purchase of the plant and property at a receiver's sale. A new company will be organized to operate the works and extensions and improvements will be made.

The Wilson-Hock Co., City Point, Va., is planning for the installation of new gas engine equipment to be used in connection with a new combination saw.

A. J. Lucas, 2112 East Main Street, Richmond, Va., is planning to purchase sheet-metal working machinery for installation in a local building.

Detroit

DETROIT, Aug. 14.

THE Paige-Detroit Motor Car Co., 100 Fort Street, West, Detroit, will commence the erection of a new building to be used as an enameling department and other operating service. William B. Cady is secretary.

The Michigan Central Railroad Co., Detroit, is considering the erection of new car shops at Bay City, Mich., to replace its present main shops at Detroit. The City Board of Commerce, Bay City, is negotiating with the company regarding a site.

The Columbia Motor Co., 6501 Mack Street, Detroit, has leased the plant of the Saxon Motor Co., and will take immediate possession. It will be used for increased production, developing an output of about 200 cars a day, compared with a present production of about 60.

The Lincoln Motor Co., Detroit, has revised plans in preparation for an addition, one-story, 250 x 850 ft. Albert Kahn, 1000 Marquette Building, is architect.

The City Commission, Cadillac, Mich., has tentative plans under consideration for a municipal electric light and power plant. A bond issue will be arranged.

A vocational department will be installed in the new three-story high and grade school, 185 x 250 ft., to be erected at Houghton, Mich., estimated to cost about $340,000.

The Detroit Marvel Brass Mfg. Co., 1742 Hilvard Street, Detroit, is planning the installation of additional equipment for machining and finishing work.

The Filer Fibre Co., Filer City, Mich., manufacturer of pulp and paper products, has arranged for a bond issue of $500,000, the proceeds to be used in connection with the erection of a new mill, estimated to cost considerably in excess of this amount with machinery.

The Detroit Edison Co., Detroit, will commence the immediate erection of an addition to its Superior power plant on the Huron River, near Ann Arbor, Mich., estimated to cost about $50,000. Gardner S. Williams, Cornwell Building, Ann Arbor, is consulting engineer.

The Ford Motor Co., Highland Park, Mich., has had plans prepared for a new two-story slag-crushing plant at River Rouge, Mich. The machinery will be electrically-operated. Albert Kahn, 1000 Marquette Building, Detroit, is architect.

Pittsburgh

PITTSBURGH, Aug. 14.

MACHINE tool business has not been brisk the past week and inquiries are also fewer. Apparently, prospective buyers are awaiting a clearing up of the labor situation before closing against inquiries. The Lima Corporation, Lima, Ohio, will require a number of tools in connection with the extension of its plant, but the list has not yet been issued.

The Weirton Steel Co., Weirton, W. Va., has put out an inquiry for an 8-stand sheet mill with a 2000-hp. motor for the drive. In connection with this installation the company is taking bids for a ladle crane and soon will inquire for three or four mill type cranes. It recently closed with the Koppers Co., Pittsburgh, for a by-product coke nd motor fuel recovery plant, the coking plant to consist of 37 ovens. This business forecasts an inquiry for at least one host and probably other equipment. The Otis Steel Co., Cleveland, which is to install a strip mill, is taking bids for the continuous furnaces, and is expected to shortly inquire for the cranes and other equipment. The H. C. Frick Coke Co. is taking bids on a conveyor system for installation in its Scottdale, Pa., mines and the National Mining Co., another Steel Corporation coal mining subsidiary, has just placed through the Dravo-Doyle Co., Pittsburgh, an order for two Nordburg hoists, for operations near Bridgeville, Pa. The Jones & Laughlin Steel Co. has ordered three 10-ton cranes and one 15-ton crane, all of 35 ft. span, for installation at the South Side works, Pittsburgh, for which Manning, Maxwell & Moore, Inc., was the successful bidder.

A local foundry is in the market for a 7½-ton, 3-motor overhead crane and the Standard Steel Spring Co., Coraopolis, Pa., has not yet acted on a 10-ton crane, with two-point lift, for which it inquired several weeks ago. The United Engineering & Foundry Co., which is taking bids on three cranes for the National Enameling & Stamping Co., St. Louis, has revised the specifications and asked for new bids.

S. S. Jones, 30 Sixth Street, Belle Vernon, Pa., has awarded a contract to the Austin Co., Union Arcade, Pittsburgh, for a two-story automobile service and repair plant, 65 x 100 ft., at Donner Avenue and Ninth Street, Monessen, Pa.

The Kurtz Brass & Wood Bed Co., Corry, Pa., will build a two-story addition, 100 x 150 ft.

A new corporation is being formed with capital of 150,000 shares of stock, no par value, to take over and operate the plant and property of the United States Glass Co., South Ninth and Bingham streets, Pittsburgh, the consideration involving $1,920,000. Extensions and improvements will be made at the works. Ernest Nickel is secretary of the company.

The Board of Education, Oil City, Pa., is reported to be arranging a list of machinery for installation at the new local high school, for which plans are being prepared by E. E. Bailey, Chambers Building.

The Freedom Oil Works, Freedom, Pa., has plans under way for a two-story addition, 48 x 75 ft., to its automobile service and repair works. J. E. Martsolf, 513 Third Avenue, New Brighton, Pa., is architect.

A vocational department will be installed in the new high school to be erected at Woodlawn, Pa., estimated to cost about $500,000. Carlisle & Sharrer, Jenkins Arcade, Pittsburgh, are architects.

Fire, Aug. 2, destroyed the plant of the Superior Glass Products Co., Adams Avenue and Nineteenth Street, Huntington, W. Va., with loss estimated at $150,000, including machinery. It is planned to rebuild.

The Miller Motor Co., 228 West Seventh Avenue, Homestead, Pa., is taking bids for a new two-story service and repair works, 75 x 110 ft., at Munhall, Pa., estimated to cost about $50,000. J. E. Dwyer, 5808 Forbes Street, Pittsburgh, is architect.

The Carmichael Motor Co., Clarksburg, W. Va., is planning the erection of a new one-story automobile service and repair works, estimated to cost $50,000. Floyd Carmichael is head.

A vocational department will be installed in the new two-story and basement junior high school building to be erected at Sistersville, W. Va., estimated to cost $100,000. Holmboe & Dixon, Empire Bank Building, Clarksburg, W. Va., is architect.

The Pittsburgh, Lisbon & Western Railroad Co., Lisbon, Ohio, is said to be planning for the installation of machinery at its locomotive repair shops at New Galilee, Pa. N. B. Billingsley is general manager.

The Beatty Motor Co., Fairmont, W. Va., recently organized, has plans under way for a new three-story automobile service and repair works. Carl E. Beatty is president.

The Clarksburg Ice & Storage Co., Clarksburg, W. Va., has plans under way for a new ice and cold storage plant, with daily capacity of about 4500 tons. The Engineering Department of the American Ice Co., is in charge.

The Central South

ST. LOUIS, Aug. 14.

THE Missouri Pacific Railroad Co., Railway Exchange Building, St. Louis, has awarded contract to the T. S. Leake Construction Co., 608 South Dearborn Street, Chicago, for a one-story addition to its car repair shops at Sedalia, Mo., and improvements in present shop.

The Eldorado Development Co., Eldorado Springs, Mo., recently organized with a capital of $300,000, is planning for the installation of additional machinery at its zinc works and will take bids early in the fall. A. B. Stricklett is president and general manager.

The Louisville Garage Co., Louisville, has plans in preparation for a new three-story and basement automobile service and repair building estimated to cost about $250,000, including equipment. D. X. Murphy & Brothers, Louisville Trust Building, are architects. Lee R. Miles is president.

The Arkansas Light & Power Co., Pine Bluff, Ark., is planning the construction of new hydroelectric generating works on the Illinois River, near Russellville, Ark., estimated to cost about $250,000, with machinery. H. C. Couch is president and general manager.

The United States Engineer Office, Nashville, Tenn., will receive bids until Sept. 5 for steel gates for Lock F, Cumberland River, as per specifications on file.

Fire, Aug. 4, destroyed the power house at the plant of the Madill Grain & Elevator Co., Madill, Okla., with loss estimated at $25,000. It is planned to rebuild.

The Southern Lumber & Mfg. Co., Nashville, Tenn., will commence the erection of two buildings, 30 x 150 ft., and 60 x 200 ft., with warehouse, 50 x 200 ft. The machinery installation is estimated to cost close to $50,000. L. Frank is secretary and general manager.

A vocational department will be installed in the new two-story high school, 70 x 120 ft., to be erected at Hickman, Ky., for which foundations will be placed under way at once. W. Earl Gore, City National Bank Building, Paducah, Ky., is architect.

The Joplin Foundry Co., East Seventh Street, Joplin, Mo., is planning for the installation of two new chain hoists, about 1 and 3-ton capacity, respectively.

The Duncan Machinery Co., 721 North Central Avenue, Knoxville, Tenn., machinery dealer, is inquiring for a lathe, 12-in. swing, belt driven, provided with hand feed and compound rest; also for boilers, horizontal, tubular type, 150 and 200 hp., and for a 150-hp. engine, throttling or slide valve type.

The Central Electric Co., North Market Avenue, Wichita, Kan., will install a lathe, drill press and other equipment at its shops.

The Union Electric Power Co., St. Louis, has been acquired by the American Edison Co., which will extend and improve its power plants and system in this section. The new company will operate with a capital of $25,000,000, and 950,000 shares of common stock, no par value.

The Dixie Power Co., Memphis, Tenn., recently organized, will commence work early in the coming year on its new hydroelectric generating plant on the White River, near Cotter, Ark. The plant will have a capacity of close to 100,000 hp., and is estimated to cost about $15,000,000, including dam and machinery. It will be supplemented by two other hydroelectric plants on the same river, the first to be known as the Buffalo dam, and the other as the Big North Fork dam, with installation to total 25,000 hp. and 30,000 hp., respectively, estimated to cost $5,000,000 and $6,000,000. An extensive transmission system will be built, totaling about 400 miles of steel towers. Colonel Henry A. Allen, 154 West Rand Street, Chicago, is engineer. Walter Powell is president.

The M. J. S. Radio Co., 128 Loraine Avenue, Wichita, Kan., will install a lathe, drill press and other equipment at its local plant.

The Tennessee Electric Power Co., Nashville, Tenn., comprising a recent consolidation of the Tennessee Power Co., Chattanooga Railway & Light Co., and the Chattanooga & Tennessee River Power Co., is disposing of a preferred stock issue of $3,000,000, a portion of the proceeds to be used for extensions and improvements in plants and system.

The Prairie Pipe Line Co., Jenks, Okla., is planning to rebuild the portion of its oil storage and distributing plant, recently destroyed by fire with loss estimated at $75,000, including equipment.

A vocational department will be installed in the new three-story and basement high school to be erected at Liberty, Mo., 140 x 189 ft., estimated to cost about $125,000, for which new bids will be asked at an early date. C. A. Smith, 602 Finance Building, Kansas City, Mo., is architect.

Cincinnati

CINCINNATI, Aug. 14.

MACHINE-TOOL orders slowed up perceptibly last week but no diminution in inquiries was evident. Favorable developments in the rail and coal strikes are confidently expected to release a number of orders for machine tools, purchase of which is being deferred on this account. While there are no new inquiries of size, the aggregate of those outstanding amounts to a considerable sum, and if only a portion of the business is placed, would mean fair activity in the industry. Orders now being booked are mostly for special machinery, suitable for rapid production. A local manufacturer is asking prices on four punch presses and an Indiana manufacturer on six tools, new or used.

Some manufacturers have declared that higher prices are certain to come as wages are steadily advancing and the cost of materials has added as much as 25 per cent to the cost of certain tools. In some cases tools are being sold, it is said, at an actual loss to clear stocks to make room for new designs, prices of which will be higher than those now in effect.

Some shops have taken considerable machine work from railroads, and while this will be only a temporary arrangement, it will keep organizations intact until the railroad difficulty is adjusted and the industry gets back to the position it held before the strike.

The Shartle Brothers Machine Co., Middletown, Ohio, manufacturer of paper mill machinery, has let contract for an addition to its plant on Clark Street, to be used principally as a warehouse.

The Indiana State Reformatory is a prospective purchaser of machine tool and foundry equipment, two new buildings for which are being erected at Pendleton, Ind., 125 x 300 ft. Work is under way on the power house.

A company will shortly be organized in Columbus, Ohio, to manufacture shafting, bolt and nut machinery and automatic screw machine products. C. W. Brightman, G. F. Brightman, H. L. Brightman and H. M. Brightman, all formerly connected with the Brightman Mfg. Co., are the organizers, and contemplated plans call for the erection of a factory.

The Clark Grave Vault Co., Columbus, Ohio, will move to a new location following the sale of its plant to the Herb Paper Box Co. It is understood that the Clark company has purchased property in the north end of the city on which a factory will be erected. No official announcement of plan has been made.

Indiana

INDIANAPOLIS, Aug. 14.

A NEW one-story and basement building, 38 x 50 ft., will be erected by the Metals Refining Co., 627 Hohman Street, Hammond, Ind., to cost about $35,000.

The Indiana Oil Refining Co., Columbus, Ind., will install an electric generator and other electrical and mechanical equipment in its plant. Stephen Schwartz is chief engineer.

The Indianapolis Street Railway Co., Indianapolis, has plans under consideration for new car shops and extensions and improvements in the power plant and electrical system.

A vocational department will be installed in the two-story and basement high school, 124 x 140 ft., to be erected at Chesterton, Ind., estimated to cost $200,000, and for which work is under way. Herbert E. Erickson, 17 East Fifth Avenue, Gary, Ind., is architect.

The Beveridge Paper Co., Pearl Street, Indianapolis, has filed plans for an addition, estimated to cost $50,000.

The Kentucky Tire Pump Co., Madisonville, Ky., has acquired the building of the Heyns Furniture Co., West Franklin Street, Evansville, Ind., for its new plant. Immediate possession will be taken and the present business will be removed from Madisonville. A new company will be organized.

A vocational department will be installed in the new high school to be constructed at Upland, Ind., estimated to cost close to $100,000. Albert Fisherbuck, Jefferson Township Trustee, is in charge.

The Board of Education, Fort Wayne, Ind., has awarded contract to the Austin Co., 208 South La Salle Street, Chicago, for a one-story vocational and mechanical training school, 40 x 120 ft., estimated to cost about $100,000.

The Mileage Oil Refining Co., Kokomo, Ind., has been reorganized and the capital increased from $100,000 to $800,000, a portion of the proceeds to be used for extensions and improvements in its refinery and system. It is planned to resume operations at the works at Fairmount, Ind., with capacity of about 1200 bbl. per day. J. C. F. Martin is president and S. W. Winder, secretary-treasurer.

The Simplex Lock Rim Co., Petersburg, Ind., manufacturer of metal rims, has work in progress on an addition to its plant. It is proposed to double, approximately, the present capacity. Considerable new machinery will be installed.

The Illinois Central Railroad Co., 135 East Eleventh Place, Chicago, has tentative plans under way for a new engine house and locomotive repair shops at Evansville, Ind., estimated to cost approximately $75,000. C. C. Kunz is general agent at this location.

Milwaukee

MILWAUKEE, Aug. 14.

AS an uncertainty growing out of the dual strikes the machine-tool trade is suffering more restriction. While industries have not abandoned hope of early settlement, the prolongation of the labor difficulties in coal mines and railroad shops has created an unfavorable prospect which has checked fall and winter plans of manufacturers. A fair amount of tool business is passing, but it is limited to the barest necessities. On the other hand, there is a relatively large volume of new business in the foreground, placement of which is to some degree delayed by the labor situation. Included in this prospective volume are the large needs of railroad shops and railroad supply industries which await strike solution.

The Milwaukee Sewerage Commission, City Hall, Milwaukee, will be in the market in about 60 or 90 days for a list of machine tools and shop equipment, including lathes, milling machines, drill presses, boring mills, etc., for a machine and service shop to be erected on Jones island. This will serve the steam generating plant, pumping plant, boiler house, and other units of the sewage disposal plant now under construction at an estimated cost of $10,000,000. Definite specifications of equipment requirements will be available within a short time. T. C. Hatton is chief engineer, and John H. Fowles, secretary of the commission.

The American Airway Transport Co. of Milwaukee, capital stock $100,000, has been incorporated in Wisconsin as a preliminary step in the proposed establishment of a large American aircraft plant and transportation system by A. H. G. Fokker of Amsterdam, Holland, in Milwaukee. The incorporators are Clarence R. Falk, vice-president Falk Corporation; T. C. Hatton, chief engineer Sewerage Commission of Milwaukee; E. M. McMahon, S. J. McMahon, and Fritz Cremer, representative of the Fokker interests in the United States. The new company has opened joint offices at 290 Third Street, Milwaukee, with the Netherlands Aircraft Mfg. Co.—Fokker, Amsterdam and New York. It is now engaged in its initial activities, consisting of a survey of manufacturing and commercial transportation facilities, prospects and possibilities.

The Seaman Body Corporation, 1732 Richards Street, Milwaukee, manufacturer of passenger car bodies, will let contracts this week for two factory extensions, one for metal work and the other for wood-working processes. The new building will be ell-shaped, 100 x 423 and 100 x 225 ft., four stories, of brick and mill construction. The present factory was erected two years ago. The Nash Motors Co., Kenosha and Milwaukee, is one of the principal owners of the Seaman company. Harold S. Seaman is secretary.

The Baraboo Linen Mills, Baraboo, Wis., owned by George S. McArthur & Sons, has plans by C. N. Ward, consulting engineer, Madison, Wis., for improvements and enlargement of its hydroelectric generating plant costing about $30,000. New water wheels and additional generating capacity will be installed.

The Superior Iron Works, Superior, Wis., has taken the contract to manufacture and install practically all of the hoisting machinery for the new ore dock being erected by the Great Northern Railway at Allouez, suburb of Superior. The plant has also booked other orders which require its maximum capacity for 10 to 12 months. While no new plant construction is in immediate prospect, miscellaneous tool and equipment needs are being filled steadily. Ewart H. Williamson is president and general manager.

The Nekoosa, Wis., Motor & Machine Co. is erecting a new brass foundry and machine shop estimated to cost about $15,000, to replace the portions of the plant destroyed by fire early in July.

Jerome Terwilliger, automobile dealer, Clinton, Wis., will build a garage, sales and service building in Beloit, Wis., at 510-512 Broad Street, to be 75 x 135 ft., two stories and basement, and cost about $50,000. Cunningham Bros., Beloit, have taken the general contract.

The Chicago, Milwaukee & St. Paul Railway Co. has ordered the abandonment of the division shop at Tomahawk, Wis., and the transfer of all machinery and equipment to the main shop of the Wisconsin valley division at Wausau, Wis., which is to be enlarged.

The Milwaukee Steam Appliance Co. of West Allis, Wis., has been organized with a capital stock of $100,000 as successor to the Steam Appliance Co., with works and offices at 709 Sixty-third Avenue, West Allis. The articles are signed by L. E. Fichaux, Gustave R. Hoffman and M. E. Engle, all of Fish, Marshutz & Hoffman, attorneys, 120 Wisconsin Street, Milwaukee.

A. Maisano, 821 Regent Street, Madison, Wis., has broken ground for a garage and repairshop, 60 x 110 ft., part two stories, estimated to cost $22,000 complete.

The Milwaukee Board of Industrial Education, Seventh and Prairie streets, will soon issue lists of requirements for shop equipment for the second unit of the new Central continuation school, which will be completed about Jan. 1. So far no details are available. R. L. Cooley is director.

The Twin Ports Marine Construction Co., Superior, Wis., has been incorporated with a capital stock of $100,000 preferred and 1000 shares of common stock with no par value, to build and repair vessels. The principal is C. A. Massey, Superior, who has been engaged in general vessel repair work for many years. C. J. Hartley and Louis A. Hanitch, attorneys, appear with Mr. Massey as incorporators.

The Kaerwer Auto Co., Oshkosh, Wis., has let the general contract to the Fluor Brothers Construction Co., local, for a machine shop and service addition, 60 x 130 ft., to its sales and service building. With equipment the improvement will cost about $35,000.

The Scholzen Spring Cushion Co., Milwaukee, has been incorporated with $10,000 capital stock as the development of a factory owned and operated by N. Scholzen at 302 Cherry Street for the manufacture of springs for automobile and furniture cushions, upholstering, etc. C. D. Marks and P. O. Koplin appear with him as incorporators.

The Wisconsin Auto Top Mfg. Co., Racine, Wis., which is enlarging its works, has increased its capital stock from $300,000 to $600,000, consisting of 5000 shares of common and 1000 shares of preferred stock.

The J. Feldman Paper Box Co., Madison, Wis., which recently opened a paper box and container factory on Regent Street, is starting work on a permanent plant on North Charter Street to cost about $45,000, including machinery, motors, etc.

The Tractor & Truck Improvement Co., Merrill, Wis., has been organized with $25,000 capital stock by Daniel Healy, J. G. Frogner and R. E. Kile to manufacture mechanical devices and appliances for the automotive industries. Announcement will be made later relative to plans and equipment needs.

Buffalo

BUFFALO, Aug. 14.

CONTRACT has been awarded by the Lautz Marble Corporation, 861 Main Street, Buffalo, to the Turner Construction Co. for a new one-story plant, 90 x 475 ft., estimated to cost about $125,000, including cutting, grinding, polishing, and testing machinery, etc.

The Western New York Electric Co., 316 North Main street, Jamestown, N. Y., is planning for extensions and improvements in its power plant and system at Falconer, N. Y., and vicinity, estimated to cost about $454,000.

A machine repair shop will be installed in the new garage and service building to be erected by the New York Telephone Co., Buffalo, at Jefferson and Delevan avenues.

The Eastman Kodak Co., Kodak Park, Rochester, N. Y., has awarded a contract to the Ridge Construction Co., Rochester, for a new two-story building, 160 x 260 ft., estimated to cost $125,000.

The Western New York Utilities Co., Main Street, Medina, N. Y., is arranging for a bond issue of $200,000, a portion of the proceeds to be used for extensions and improvements. C. S. Sweet is vice-president.

A vocational department will be installed in the new two-story high school, 50 x 130 ft., to be erected at Clarence, N. Y., for which excavation work will commence at once. It will cost in excess of $150,000. Herbert C. Swain, 52 West Chippewa Street, Buffalo, is architect.

The Chautauqua Cabinet Co., Mayville, N. Y., is planning for enlargements in its plant to include the installation of additional equipment.

The Chapin-Skelton Machine Co., Syracuse, N. Y., recently organized, will operate a plant to manufacture clothes pressing machinery and parts. The company is closely affiliated with the Brown-Lipe-Chapin Co., manufacturer of automobile transmissions and gears. E. I. Chapin, of the latter company, will act as factory manager. O. H. Green is president.

T. Kennard Thomson and Peter A. Porter, Marine Bank Building, Buffalo, have made application to construct and operate a hydroelectric power plant at Foster Flats, Lower Niagara River. The ultimate project will develop an excess of 1,000,000 hp., and is estimated to cost more than $40,000,000.

The Champion Rotary Motors, Inc., Buffalo, care of L. F. Lindall, attorney, Erie County Bank Building, representative, has tentative plans for a new factory to manufacture rotory engines.

The plant of Jewett & Co., stove manufacturers, Military Road, Tonawanda, N. Y., was destroyed by fire Aug. 10 with an estimated loss of $200,000.

The Gulf States

BIRMINGHAM, Aug. 14.

PLANS are nearing completion for the establishment of works for the Crown Shock Absorber Co., 517 West Building, Houston, Tex., recently organized to manufacture shock absorbers, a part of initial operations to be devoted to assembling. A machine shop will be equipped, as well as departments for enameling and nickel plating. S. B. Segura is president.

The Board of Electric Commissioners, Austin, Tex., will make extensions and improvements in the municipal power plant, estimated to cost about $150,000. New equipment will be installed, including a 5000-kw. generator. Walter L. Eyres is head of the board.

The Merrill-Stevens Drydock & Repair Co., Jacksonville, Fla., has acquired the local plant and business of the T. Murphy Iron Works and will use the property for enlargements.

The Barclay Petroleum Co., Linz Building, Dallas, Tex., has acquired the plant and property of the Star Oil Co., Breckenridge, Tex., for about $100,000. The new owner will continue the operation of the property, and plans for extensions and improvements. George Harris is vice-president and general manager.

The Rockett Foundry & Machine Co., Hattiesburg, Miss., has plans nearing completion for an addition and the installation of new equipment. N. W. Rockett is president.

The Board of City Commissioners, Jacksonville, Fla., will receive bids until Aug. 24 for electrical equipment for the city power house. W. A. Evans is chairman.

A power house will be constructed by the Allied Chemical Co., Dallas, Tex., in connection with its new two-story plant, 40 x 125 ft., at Alma Street and Santa Fe Avenue, for which work will soon be placed under way. It will cost about $50,000. W. R. Sparkman is president, and H. H. Howard, vice-president and general manager.

William H. Kempler, Deer Park, Fla., has plans under way for the construction of a new ice and cold storage plant, 55 x 80 ft., at Melbourne, Fla.

The City Council, Quincy, Fla., will receive bids until Aug. 24 for electrical and other equipment in connection with extensions to the municipal power plant and waterworks, including electric generator, uniflow engine, pumps, boilers, air compressors, motors, etc. The J. B. McCrary Engineering Corporation, Atlanta, Ga., is engineer. J. P. Smith is city clerk.

The mills and timber properties of the Miller-Link Lumber Co., in the vicinity of Shreveport, La., have been acquired by A. J. Peavy, Shreveport, and associates, for $800,000. The new owners will organize a company to operate the plant and contemplate extensions and improvements in the mills. Randall T. Moore, vice-president, Commercial National Bank, Shreveport, is interested in the enterprise.

The United States Engineer Office, 329 Custom House, New Orleans, will take bids until Sept. 5 for the construction of two steel oil barges, each with a capacity of 4000 bbl, for use on the Mississippi River, as per plans and specifications on file.

The Common Council, Brownfield City, Tex., will make extensions and improvements in the municipal electric light and power plant. Additional equipment will be installed.

Hoisting and conveying machinery, elevators and other freight-handling equipment will be installed in the new five-story and basement warehouse, 190 x 250 ft., to be erected by Raymond P. Caruth, Dallas, Tex., and associates, estimated to cost about $550,000. Bertram C. Hill, Dallas, architect, is in charge.

A. C. Campbell, Winnfield, La., is organizing a company to build and operate a plant to manufacture concrete blocks, tiles and kindred products.

The Keystone Lime Works, Keystone, Ala., recently organized, has acquired a local building and will install hydrating, electrical and general equipment for a daily output of 1000 bbl. George L. Scott, Longview, Ala., and W. A. Hammond, Saginaw, Ala., head the company.

The Marion Machine, Foundry & Supply Co., Mexia, Tex., specializing in the production of oil well equipment, is planning to rebuild the portion of its works recently destroyed by fire with loss of $65,000.

The Pacific Coast

SAN FRANCISCO, Aug. 8.

ABOUT five acres has been acquired by the Highland Mfg. Co., Lafayette, Cal., as a site for a new plant to manufacture automobile equipment. A large part of initial operations will be devoted to assembling. A housing development for employees will also be built.

The Guaranteed Battery Equipment Co., 1105 West Pico Street, Los Angeles, is planning to rebuild the portion of its plant, destroyed by fire, Aug. 2, with loss reported at $20,000.

A vocational department will be installed in the new high school to be erected by the Kerman Union High School District, Kerman, Cal., estimated to cost about $150,000. A. Johnson, Kingsburg Bank Building, Kingsburg, Cal., is architect.

The Atchison, Topeka & Santa Fe Railway Co., Kerckhoff Building, Los Angeles, is taking bids for a new electric power plant at San Bernardino, Cal., 80 x 103 ft., estimated to cost about $100,000. The engineering department of the company is in charge.

The Consumers' Milk Co., Los Angeles, has preliminary plans for a new two and three-story ice-manufacturing, cold storage and bottling plant, 60 x 150 ft., to cost about $200,000. Truesdell, Purrington & Newton, 304 San Fernando Building, are architects.

The Atlas Imperial Gas Engine Co., foot of Twenty-second Avenue, Oakland, Cal., has plans under way for an addition to provide extra floor area of about 45,000 sq. ft.

The Pioneer Rubber Co., 68 Sacramento Street, San Francisco, will soon award a general contract for a new two-story plant, 80 x 200 ft., at Pittsburg, Cal., estimated to cost about $150,000.

A vocational department will be installed in the new three-story high school, 145 x 150 ft., to be erected at Selma, Cal., estimated to cost about $200,000, for which bids will be called soon. Norman F. Marsh, 211 Broadway-Central Building, Los Angeles, is architect.

The Eames Co., 55 First Street, San Francisco, manufacturer of factory hand trucks, etc., will soon commence the erection of a new one-story plant at Fifth and Howard streets.

The Potlatch Lumber Co., Spokane, Wash., has commenced the erection of a new mill, estimated to cost about $100,000, including machinery and electrical equipment.

The Peterman Mfg. Co., Tacoma, Wash., is planning to rebuild its lumber mill recently destroyed by fire with loss estimated at $175,000, including machinery. It will be electrically-operated. T. A. Peterman is president.

The Bunker Shingle Mill Co., Bunker, Wash., will soon commence rebuilding its plant, recently destroyed by fire. It is estimated to cost close to $60,000, or approximately the amount of the fire loss. Jesse Wasser heads the company.

The Northwestern Wire & Fence Co., Portland, Ore., has acquired a two-story building at Eleventh and Flanders streets, which will be remodeled for new works.

The Tonga Lumber Co., Seattle, Wash., has tentative plans for rebuilding the portion of its mill recently destroyed by fire, with loss estimated at $150,000, including equipment.

Canada

TORONTO, Aug. 14.

THE past week machine tool buying has been limited, but dealers and manufacturers are still of the opinion that business will begin to show steady improvement early next month. The coal strike and transportation difficulties in the United States are being reflected in some commodities in the Dominion, but interests in practically all lines hold to the expectation that these troubles will shortly be overcome and business will be resumed on something of the old basis in the near future.

The automotive industry continues to hold up its end in equipment buying, but foundries and steel plants generally are only entering the market for special lines from time to time. Wood-working tools and equipment are moving freely and according to the number of plants under construction will be in active demand later in the year. Extensive lists are expected from automobile concerns in Toronto, Windsor and Walkerville, which are erecting factories at these points. Equipment for waterworks, sewage and electric plants is holding up and companies turning out this class of machinery are deriving considerable business from this source. Small tools are in brisk demand with users buying for immediate requirements and stock purposes. Prices are holding firm in most cases, but some shading is again reported in certain districts.

G. W. Gordon, clerk, Port Credit, Ont., is asking for equipment for a waterworks plant, including pumps, valves, castings, erecting overhead steel tank, building settling basin, filters, reservoir and pumping station, meters, gages, hydrants, etc.

Stanley & Aylward, manufacturer of Norman silver plate, will establish a plant at Kingston, Ont., and the removal of machinery from the Toronto plant will begin immediately.

Brodeur & Pilon, architects, Hull, Que., are preparing plans for a factory to be erected at Hull for the Lion Tire Co.

Several thousand dollars damage was done Aug. 7 to the plant of the Galt Malleable Iron Co., Galt. Reconstruction work will be started immediately.

The Bassick Mfg. Co., of Chicago, Ill., manufacturers of Alemite system of lubrication, will establish a manufacturing plant at Belleville, Ont.

The Johnson Wire Works, Ltd., Montreal, has been incorporated with a capital stock of $225,000 by Alexander C. Casgrain, Leslie G. Bell; Sadi C. Demers and others as provisional directors. It will acquire and take over the plant and business of C. H. Johnson & Sons, Ltd., and will continue as agents in Canada for the company.

Receivers who for several months have had charge of the affairs of the American Flexible Bolt Co., Pittsburgh, with a plant at Zelienople, Pa., were discharged by Judge Reid of the Common Pleas Court, Pittsburgh, Aug. 5. A petition presented in behalf of important creditors declared that the affairs of the company had been straightened out in a manner satisfactory to both creditors and stockholders and that as a result of a financial rehabilitation, the company now was in a solvent condition.

Plans of New Companies

[No news in regard to new incorporations is published in THE IRON AGE until it has been investigated by correspondence or by personal call.]

The Allan Mfg. & Welding Co., Inc., was recently organized to take over and conduct the business of the Allan Mfg. & Welding Corporation, and is located at 720 Washington Street, Buffalo, N. Y. The new company will continue to make the Allan polyphase welder, also conducting a general welding repair business.

The Florandin Equipment Co. has been organized by C. H. Florandin with offices at 110 West Fortieth Street, New York, to act as representatives of the Conveyors Corporation of America, Chicago. The new company will also do general contracting business in boiler rooms and industrial plants in the vicinity of New York.

The Oneonta Storage Battery Corporation, Oneonta, N. Y., will have its new structure ready for operation by Oct. 1. It will manufacture Kalo storage batteries.

The Jamestown Malleable Products Corporation, Jamestown, N. Y., has installed a modern foundry and has a plant equipped ready to produce 25 tons daily of malleable castings for automobile and railroad use. H. E. Kies will head the organization.

The Metro Electric Mfg. Co., has been incorporated with a capital stock of $100,000, to manufacture electrical equipment. Plans for operation will be determined in the near future. Address M. Eichner, 1545 Broadway, New York.

The Standard Electro-plating Co. has been chartered under the State laws to manufacture metal goods and to do plating work. It is doing electro-plating in nickel, brass and silver in limited quarters at 155 West Fifty-sixth Street, New York. The erection of a new plant is being contemplated. Incorporators: G. S. Harris, A. Fraun and I. Mines. Hirschman & Roeder represent the company.

The Shuman-Nicholas Co., 2581 Beecher Street, Detroit, Mich., which was recently organized, will handle machinery and other factory supplies as a selling agency. At the present time it is introducing the Chesterfield Cutting Metal, a non-magnetic, non-temperable alloy for use in machining operations on cast iron, cast steel and malleable.

The Accurate Die & Stamping Co., 467 West Thirty-first Street, Chicago, was recently incorporated with a capital of $25,000, to manufacture metal products. It announces that for the present it will manufacture dies and small metal specialties. Incorporators: T. L. Lusk, F. A. Gingerella and J. Schmidt.

The Clifton Mfg. Co., 189 Market Street, Newark, N. J., is in the market for radio equipment parts, which it will assemble to complete its product, the Clifton radio detector.

The Crown Shock-Absorber Co., Houston, Tex., is in the market for compressed steel wire springs, bolts, nuts and name plates. It has been incorporated under the Texas laws to manufacture shock absorbers for Ford cars. Malleable iron castings will be made by the Ross-Meehan Foundries, Chattanooga, Tenn. In the near future the new company plans to open an assembling plant in Houston to assemble the Crown shock absorber, which it is placing on the market. S. B. Segura is president of the company.

The Canton Malleable Iron Co., Canton, Ohio, is adding an annealing department to its plant. It will be in the market for electric charging trucks for annealing ovens in the near future.

The United States Metal Products Manufacturers and Export Corporation, Tampa, Fla., recently incorporated, will manufacture a line of metal products used in the agricultural and automotive industries.

A. Lamy & Son, pattern maker, has purchased the business and property of Parsons Mfg. Co., consolidating the organizations, which have been incorporated under the name A. Lamy & Son, Inc. The business of the Parsons Mfg. Co., which consisted in manufacturing stokers, ash-ejectors, burners and kindred equipment, will be continued together with the pattern making business, which has been conducted by A. Lamy & Son for nearly 30 years. Edward J. Lamy, 535 Livingston Street, Elizabeth, N. J., is secretary.

The Paramount Radio Co., Inc., Warsaw, Ill., has been incorporated to manufacture radio equipment, including a special receiving instrument known as the Paramount. It will also do jobbing and wholesaling in radio supplies.

The Lead-Kote Process, Inc., has been chartered with a capital of $100,000 to coat all kinds of ferrous articles with lead or lead alloys. Temporarily the company will occupy a plant at Sixth Street, Long Island City, L. I., which it is remodeling and hopes to have ready for operations by Sep-

The officers are: M. Robinson, president; I. Lavine, vice-president, and L. C. Bardi, secretary.

The Heller & Radiator Corporation, Rochester, N. Y., has been incorporated to manufacture heating, plumbing, electrical and builders' supplies with a capital of $30,000, consisting of $100 shares. The directors, all of whom live in Rochester, are: M. S. Welsh, W. F. Devendorf, 470 Court Street, and C. E. Bostwick.

The Erie Enameling Co., Erie, Pa., recently incorporated in Pennsylvania with a capital of $50,000, will do a general line of jobbing enameling work. The company will lease a building of fireproof construction containing 7000 sq. ft. of floor space, now under construction. Officers are H. E. Schumacher, president; H. R. Spencer, secretary-treasurer.

The Commercial Electric Mfg. Co., 442 First Ave., Pittsburgh, recently incorporated with a capital of $25,000 and will manufacture switch boards and electrical control apparatus and has leased a plant at the above address. The company has supplied its machinery requirements. Officers are R. F. Clark, president; J. M. Miller, treasurer; S. M. Miller, secretary, J. L. Lynds, general manager.

The Ellwood Steel Corporation, Ellwood City, Pa., recently incorporated with a capital of $5000, will manufacture wire nails. The company will install a wire drawing mill and about 20 additional nail machines. This equipment already has been purchased. The company is undecided whether to build an extension to the existing plant or to buy an adjoining factory building.

The Precision & Thread Grinder Mfg. Co., South Twenty-first street, Philadelphia, has been acquired by A. T. Doud, Philadelphia. The officers are A. T. Doud, president and treasurer, and F. V. Doud, secretary. They together with C. A. White, are the directors. President Doud is a mechanical engineer graduated from Purdue University. He was formerly mechanical engineer for Hale & Kilburn Co., Philadelphia; general superintendent of the Speakman Co., Wilmington, Del. and works manager of the Diehl Mfg. Co., Elizabeth, N. J. During the war he was general manager of the Hero Mfg. Co., Philadelphia, which made gas masks for the American Expeditionary forces under plans and methods developed under Mr. Doud's direction. After the war he was manager of manufacturing for the American Tube & Stamping Co., Bridgeport, Conn. Mr. White is secretary of Leeds & Northrup Co., Philadelphia. He was associated with Mr. Doud at both the Hero and the American Tube & Stamping Companies. F. Rodger Imhoff will be associated with the new organization as consulting engineer. The company's multi-graduated precision grinder is used for grinding thread gages, taps, dies, chasers, etc., also for internal grinding. The company also manufactures a thread lead variator for obtaining precision lead from the ordinary lathe lead screw; also to elongate the lead on parts which are subsequently to be hardened, to compensate for the approximate shrinkage in lead, eliminating correction grinding in non-precision work; and reducing the grinding correction necessary in precision work. Metric threads and any threads of odd or unusual lead may be cut by the use of the variator without requiring special or transplanting gears. Among other things the company makes a gage block for testing lead screws and for setting and testing the lead variator and a permanent alinement wheel truing head for use on all the grinders. The company will be reorganized in all departments.

Trade Changes

The Thompson Foundry & Machine Works, Burlington, N. C., and the Universal Heater & Metal Mfg. Co., Charlotte, N. C., have combined, the merged plant representing invested capital to the amount of $75,000.

Homer F. Livermore, Inc., 85 Pearl Street, Boston, has changed its firm name to the Guaranteed Parts, Inc., at the same address.

B. L. Schmidt & Co., Davenport, Iowa, has changed its name to the Micro Grinder Co., and has moved to Bettendorf, a suburb of Davenport.

Holt & Merrall, Inc., 342 Madison Avenue, New York industrial real estate, has changed its name to William B. Merrall, Mr. Holt having resigned from the company.

The Boustead Electric & Mfg. Co., Inc., Minneapolis, Minn., has been appointed northwestern distributers for the Ideal Electric & Mfg. Co., Mansfield, Ohio, manufacturer of squirrel cage, direct current, and synchronous motors, AC and DC generators up to 1000 kw., motor generator sets, electro-plating outfits, etc. The Boustead company for years has specialized in rebuilt motors and generators and manufactures switchboards.

The U. S. Electro Galvanizing Co., 32 Stockton Street, Brooklyn, has changed its name to the U. S. Galvanizing & Plating Equipment Corporation. Personnel remains unchanged, and it will continue to manufacture mechanical and automatic cleaning, pickling, acid dip, neutralizing, washing and galvanizing apparatus.

The Press Weld Products Co., recently formed, will take the place of the Pennsylvania Iron & Steel Products Co., which was reorganized three weeks ago. D. E. Frew, First National Bank, Ellwood City, Pa., is interested.

The Chapin & Baker Mfg. Co., Inc., and the Skelton Tool Co., both of Syracuse, N. Y., completed a merger in July. The corporate name of the new company is the Chapin-Skelton Corporation, located in the same city at 406 Ash Street. It will manufacture reamers, boring bars and production tools.

The Lonergan Cutting Die Co., 4514 Lexington Street, Chicago, has changed its name to the Lonergan Die Co. It makes dies for cutting soft materials.

The Mercury Radio Products Co., 51 Thomas Street, Orange, N. J., is moving to its new plant in Little Falls, N. J.

The Norwalk Iron Works, Norwalk, Conn., which recently absorbed the plants, patents, designs and property of the Automatic Carbonic Machine Co., Peoria, Ill., is planning the removal of the business to Norwalk.

The Spaulding Electric Co., is now at 1346 Michigan Avenue, Detroit.

The Chicago Flexible Shaft Co., Chicago, announces the change in address of its New York office for Stewart Industrial Furnaces, from 350 Broadway to 16 Read Street, New York.

The American Machine Products Co. has changed its name to the Ampco Twist Drill & Tool Co., Detroit.

The Pittsburgh office of E. J. Lavino & Co. has been removed from 1922 Oliver Building to room 509 of the same building.

The Westinghouse Electric & Mfg. Co., announces the transfer of the industrial heating section from the supply sales department to the industrial sales department. Wirt S. Scott, is directing the activities of this unit and associated with him are M. R. Armstrong, A. T. Ruttencutter, H. W. Lincoln, John M. Strait and C. R. Dakin.

William E. Hoblitzelle, who with his associates recently purchased the controlling interest in the Smith & Davis Mfg. Co., St. Louis, maker of bed springs and beds, has been elected president of the company. Other officers are: Vice-president, James C. Harvey; secretary, J. H. Kentnor, and treasurer, W. H. Whitehill.

The Globe Steel Tubes Co. has been incorporated under the laws of Delaware following the change in the principal interest in the Globe Seamless Steel Tubes Co., Milwaukee, as recently announced. The new corporation has a capital stock of $500,000 preferred and 100,000 shares of common without par value. The incorporators are C. F. Schlundt, Charles G. Jarchow and Thomas J. Christian, all of Chicago. By the recent transfer of ownership, William Renshaw, Chicago, president, and Lawrence Fitch, Milwaukee, vice-president and secretary, retire. Frank J. O'Brien continues as vice-president and general manager. The new ownership is represented by Robert P. Lamont, president American Steel Foundries, Chicago; Paul J. Kalman, president Paul J. Kalman Co., St. Paul, Minn., and Mr. O'Brien. As part of the financing planned when the property was sold, a first mortgage loan of $1,200,000 has been made by the First Trust & Savings Bank, Chicago.

The Curtain Supply Co., 350 West Ontario Street, Chicago, will move to Elkhart, Ind., where a one-story plant, 179 x 400 ft., is being constructed.

The Cherrytree Machine Co., Cherrytree, Pa., following a recent reorganization and change of name to the Brown Mine Equipment Co., has arranged for the removal of its business to Johnstown, Pa., where extensive increase in manufacturing facilities will be provided. The plant will specialize in the manufacture of hoisting machinery, pumps, etc., for mine service. H. V. Brown is president, H. J. Meehan, vice-president, and J. C. Cosgrove, secretary.

The Electro-Magnetic Tool Co., 2902 Carroll Avenue, Chicago, has changed its address to Nineteenth Street and Fifty-second Avenue, Cicero, Ill.

The Barnes Foundry Co., Inc., 169 Second Street, Jersey City, N. J., has moved its office and salesroom to 515 West Fifty-sixth Street, New York. The foundry is now located in a new plant at Freeland, Pa.

Carson & Co., Pennsylvania Building, Philadelphia, has been appointed selling agent in the Philadelphia district by the Sizer Steel Corporation, Buffalo.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossbile to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined iron bars, base price	2.83c.
Swedish bars, base price	7.00c.
Soft steel bars, base price	2.83c.
Hoops, base price	4.03c.
Bands, base price	3.63c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.93c.
Channels, angles and tees under 3 in. x ¼ in., base	2.83c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.83c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.93c.
Toe-calk, ½ x ⅜ in. and larger	3.70c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.65c.
Squares, flats and hex	4.15c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.93c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.93c.
No. 12	3.98c.
No. 14	4.03c.
No. 16	4.13c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	4.00c. to 4.30c.	.....
Nos. 22 and 24	4.05c. to 4.35c.	4.60c.
No. 26	4.10c. to 4.40c.	4.65c.
No. 28	4.20c. to 4.50c.	4.75c.
No. 30	4.45c. to 4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher

Galvanized

	Per Lb.
No. 14	4.30c. to 4.60c.
No. 16	4.45c. to 4.75c.
Nos. 18 and 20	4.60c. to 4.90c.
Nos. 22 and 24	4.75c. to 5.05c.
No. 26	4.90c. to 5.20c.
No. 27	5.05c. to 5.35c.
No. 28	5.20c. to 5.50c.
No. 30	5.70c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt..	—56	—40	¾ in. Butt..	—30	—13
¾ in. Butt..	—61	—47	1¼ in. Butt..	—32	—15
1-3 in. Butt..	—63	—49	2 in. Lap....	—27	—10
3½-6 in. Lap.	—60	—46	2½-6 in. Lap.	—30	—15
7-8 in. Lap..	—56	—34	7-12 in. Lap.	—23	— 7
9-12 in. Lap.	—55	—33			

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	3.50c. to 3.75c.
Annealed soft	3.50c. to 3.75c.
Galvanized annealed	4.25c. to 4.50c.
Coppered basic	4.00c. to 4.25c.
Tinned soft Bessemer	5.50c. to 5.75c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	18¾c. to 19¾c.
High brass wire	19¼c. to 20¼c.
Brass rod	16¼c. to 17¼c.
Brass tube, brazed	25⅝c. to 26⅝c.
Brass tube, seamless	22½c. to 23 c.
Copper tube, seamless	24¾c. to 25 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 22¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb..	$6.05	$5.80
			90 lb..	6.15	5.90
			100 lb..	6.25	6.00
IC..	$10.00	$8.50	IC..	6.40	6.15
IX..	11.50	10.00	IX..	7.40	7.15
IXX..	13.00	11.25	IXX..	8.40	8.15
IXXX..	14.25	12.50	IXXX..	9.40	9.15
IXXXX..	16.00	14.00	IXXXX..	10.40	10.15

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits, pig	35c.
Bar	42c. to 46c.

Copper

Lake ingot	15¼c.
Electrolytic	15 c.
Casting	14¾c.

Spelter and Sheet Zinc

Western spelter	8 c. to 8½c.
Sheet zinc, No. 9 base, casks	8¾c. open 9¼c.

Lead and Solder*

American pig lead	6¾c. to 7c.
Bar lead	8c. to 8½c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23½c.
Refined solder	20¼c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	25c. to 27c.

Old Metals

The market continues firm and business is fair. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	11.75
Copper, heavy wire	11.25
Copper, light and bottoms	9.25
Brass, heavy	6.25
Brass, light	5.25
Heavy machine composition	8.50
No. 1 yellow brass turnings	6.50
No. 1 red brass or composition turnings	8.00
Lead, heavy	4.50
Lead, tea	3.50
Zinc	3.25